

THE DEVELOPMENT OF SUICIDAL IDEATION AND SELF-HARM IN CHILDHOOD
AND ADOLESCENCE

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THE DEVELOPMENT OF SUICIDAL IDEATION AND SELF-HARM IN CHILDHOOD AND ADOLESCENCE

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Theory and research emphasize child maltreatment (child abuse and child neglect) as a factor conferring long-term risk for suicidality, while interpersonal conflicts and losses increase short-term risk in vulnerable individuals. Prior research has been limited by a dearth of studies in young children, cross-sectional designs, and a lack of research examining which risk factors differentially associate with suicidal ideation versus self-harm/suicide attempts. This dissertation is comprised of three papers on child and adolescent suicidal thoughts and behaviors which address each of these limitations.

The results in Chapter Two are from a large study of young children at risk for child maltreatment and are congruent with what has been found in studies of adolescents and adults. Namely, that internalizing difficulties increase risk for suicidal ideation, while externalizing problems and attentional dysregulation associate with more severe suicidal behaviors such as self-harm/suicide attempts. Results also suggest that broader exposure to different forms of child maltreatment and the physical neglect subtype “failure to provide” are important for the development of suicidal ideation and self-harm in early childhood, respectively. The strongest associations were between age 4 suicidal ideation and self-harm with these two respective behaviors at age 6.

The second paper (Chapter Three) investigated developmental mechanisms involved in the

link between child maltreatment and suicidal ideation and self-harm occurring in middle childhood (age 9). Results suggest pathways from parental psychological aggression and neglect in early childhood (age 3) to suicidal ideation and self-harm via comorbid clinical levels of anxious-depressive symptoms and aggressive behaviors (age 5). The analyses in the third study (Chapter Four) demonstrate the importance of interpersonal loss and a greater number of stressful life events for the first transition from thinking about suicide to acting in adolescence. Results from interactions between stressful life events and factors hypothesized to increase and decrease the risk of stressful life events on transitioning from suicidal ideation to suicide attempt provided mixed support for diathesis-stress models of suicide risk. Together, these three papers contribute to our nascent understanding of early contributors for suicidal ideation and self-harm risk in children and adolescents.

BIOGRAPHICAL SKETCH

Elise Paul obtained her Bachelor of Science in Biological Sciences from the University of California, Irvine in Biological Sciences in 2007. While working as a classroom tutor for underserved youth in Southern California, Elise became concerned about child welfare and interested in child development. In 2010, she completed a Master of Arts in Science Education from Teachers College, Columbia University. During a fellowship as a Master's student, Elise conducted research in classrooms for vulnerable youth. After working with children and adolescents across these different contexts, Elise became convinced that she should formally pursue her curiosity about environmental influences on children's development and applied to doctoral programs. She received her Master of Arts from Cornell University in Human Development in 2013. After receiving her Ph.D., Elise will work as a scientist at the University of Leipzig Psychiatric Clinic in Leipzig, Germany.

For Joan

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INTRODUCTION

CHAPTER ONE

THE DEVELOPMENT OF SUICIDAL IDEATION AND SELF-HARM IN CHILDHOOD AND ADOLESCENCE: AN INTRODUCTION

The Development of Suicidal Ideation and Self-Harm in Childhood and Adolescence: An Introduction

Fatal and non-fatal suicidal behaviors represent serious public health issues for children and adolescents. In the United States, suicide is the 2nd leading cause of death for youth ages 15-19 and the 3rd leading cause for ages 10-14 (Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control, 2017). Rates of suicidal thoughts and behaviors increase significantly with the transition to adolescence (CDC, 2017; (Nock et al., 2013), yet these phenomena also occur in younger children (e.g. Bridge et al., 2015; Kovess-Masfety et al., 2015). Data from community samples of children suggest that rates of suicidal ideation range from 9 to 17% (Kovess-Masfety et al., 2015; Pfeffer, 1990; Wyman et al., 2009), which is similar to the 12-18% observed in general population adolescents (Kann et al., 2016; Nock et al., 2013).

Across the lifespan, suicidal ideation and self-harm (suicide attempts and self-harm) are the most reliable predictors of eventual death by suicide (Beckman et al., 2016; Freuchen, Kjelsberg, Lundervold, & Grøholt, 2012; Hawton et al., 2015; Pfeffer et al., 1993). Prior self-harm also significantly increases the probability of premature mortality due to natural causes (Bergen et al., 2012; Mäki & Martikainen, 2017). Every year, approximately 9% of U.S. high school students make a suicide attempt, and less than three percent of these attempts result in medical care (Kann et al., 2016). Thus, understanding markers of risk associated with the emergence of suicidal ideation and self-harm in children and adolescents are important for prevention.

Diathesis-stress models of suicide risk posit that early adversities, particularly child abuse

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and neglect (child maltreatment), interact with genetic vulnerability to confer long term susceptibility to suicidal behaviors (Bridge, Goldstein, & Brent, 2006; Brodsky, 2016; Hawton, Saunders, & O'Connor, 2012). The diatheses in these models typically include traits of impulsivity, aggression, and pessimism/hopelessness (Bridge et al., 2006; Brodsky, 2016; Hawton et al., 2012; Mann, Waternaux, Haas, & Malone, 1999). Psychiatric disorders are among the most widely studied risk factors for suicidal ideation and suicide attempts (Franklin et al., 2017). Relative to their non-suicidal peers, youth with suicidal behavior exhibit more psychiatric disorders with underlying disturbances in mood, impulse control, and aggression (Foley, Goldston, Costello, & Angold, 2006; Herba et al., 2007; Wyman et al., 2009).

Mood disorders such as depression increase the risk for suicidal ideation, but do not distinguish those who think about suicide and attempt from those who think about it (Borges, Angst, Nock, Ruscio, & Kessler, 2008; Kessler, Borges, & Walters, 1999; Nock et al., 2013). Impulsive aggression, the experience of multiple near-term stressors such as interpersonal conflict or loss should influence the progression from suicidal ideation to suicide attempt in youth (Bridge et al., 2006; Turecki & Brent, 2016). Behavioral inhibition such as that due to substance misuse and high anxiety may also be factors interacting with suicidal ideation that increase the likelihood of a suicide attempt (Turecki & Brent, 2016).

Empirical support for these models comes from epidemiological surveys, which indicate that while depression predicts suicide ideation, disorders characterized by severe anxiety or agitation or poor impulse control predict who will transition to a suicide attempt (Nock, Hwang, Sampson, & Kessler, 2010). Because only approximately one-third of adolescents who think about suicide attempt suicide, understanding the factors associated with the transition from thinking about suicide to attempting is a research priority (Glenn & Nock, 2014). Chapter Four in this

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dissertation directly addresses this need by examining statistical interactions between factors which should, according to these diathesis-stress models of suicide risk, increase the likelihood of transitioning from thinking about suicide to attempting suicide.

When individuals who are already prone to suicidal thoughts and behaviors because of these factors encounter stressors, particularly interpersonal loss and discord, the likelihood of a suicide attempt increases (Bridge et al., 2006; Brodsky, 2016). The interaction of these factors culminates in a suicide crisis, which is the time immediately preceding a suicide attempt. The suicide crisis is often characterized by intense psychological suffering, particularly hopelessness, despair, and anger (Hendin, Maltzberger, & Szanto, 2007; Maltzberger, 2004). Children and adolescents are no exception. The most frequently and consistently cited reasons for self-harm and suicide attempts in youth are to “obtain relief from a terrible state of mind”, “escape for a while from an impossible situation”, and to “stop feeling pain” (Boergers, Spirito, & Donaldson, 1998; Jacobson, Batejan, Kleinman, & Gould, 2013; Kienhorst, De Wilde, Diekstra, & Wolters, 1995; Scoliers et al., 2009).

Although the stated or inferred presence of some intent to die is a key characteristic of suicide attempt definitions, most adolescents report more than one motive for attempting suicide (Boergers et al., 1998; Jacobson et al., 2013). In community (Jacobson et al., 2013; Rodham et al., 2004) and clinical (Boergers et al., 1998; Rodham et al., 2004) studies of adolescents who have attempted suicide, only up to one quarter of youth said that they had attempted suicide because they wanted to die. Indeed, a recent systematic review found that the most widely cited reasons for self-harm and suicide attempts other than to die are to deal with distress and exert interpersonal influence (Edmondson, Brennan, & House, 2016).

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The precipitating circumstances influencing children's and adolescents' suicidal behavior involve events that appear unexceptional. Family conflicts are consistently among the most commonly reported and identified precipitants of youth suicidal behavior (Beautrais, 2001; Beautrais, Joyce, & Mulder, 1996; Brent et al., 1988; Dieserud, Gerhardsen, Van den Weghe, & Corbett, 2010; Hawton, O'Grady, Osborn, & Cole, 1982; Soole, Kølves, & De Leo, 2015). Beautrais (2001) reported that 70.5% of youth suicides had a family conflict as a triggering factor. Together, these observations imply that the capacity to tolerate difficult feelings and disruptions in interpersonal relationships are key aspects of thinking about and attempting suicide.

Research also strongly supports the role of child abuse and neglect conferring long term vulnerability to suicidal ideation and suicide attempts (Devries et al., 2014; Miller, Esposito-Smythers, Weismore, & Renshaw, 2013; Norman et al., 2012). Compared to adolescents who are not suicidal, adolescents who attempt suicide are much more likely to have been sexually and physically abused (Evans, Hawton, & Rodham, 2005; Gilbert et al., 2009), and to have experienced two or more forms of child maltreatment (Hahm, Lee, Ozonoff, & Wert, 2010). However, most subsequent research in this area has focused on physical and sexual traumata, and most such studies are cross-sectional (Brodsky, 2016; Miller et al., 2013). A recent meta-analysis reported that among the various forms of child maltreatment, emotional abuse carried the strongest risk for suicide attempt (Liu et al., 2017). Emotional maltreatment, especially with an onset in early childhood, has also been linked to children's self-perceptions and rejection by peers in middle childhood (Bolger, Patterson, & Kupersmidt, 1998).

Therefore, considering other forms of child maltreatment is necessary. The studies in Chapters Two and Three in this dissertation address these limitations by examining a range of

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child maltreatment types. There are several additional theoretical perspectives that are useful for extending and elaborating which child adversities and features of the parent-child relationship are relevant for the emergence of suicidality. For example, parents who do not provide consistent and empathic responses to the child's distress leave the child vulnerable to extreme helplessness and despair when faced with loss, disappointment, or separation (Adam, 1994; Maltsberger, 1986; Pfeffer, 1986). Other research confirms that children and adolescents threaten and attempt suicide under conditions of long-standing parental resentment, hostility, and lack of emotional availability (Pfeffer, 1986; Sabbath, 1969). The suicidal child may have therefore internalized an inner sense of badness. Parental rejection may also be subtle; some children will correctly sense that they are only wanted to the extent that they can meet the needs of the parents (Pfeffer, 1986), including relieving the parents of their own disturbances by acting as a scapegoat (Orbach, 2007).

Although there are many consistencies regarding risk factors for suicidality across the lifespan, there also appear to be important clinical differences between adolescents and children (Dervic, Brent, & Oquendo, 2008; Tishler, Reiss, & Rhodes, 2007). For example, mood disorders and substance use appear to be less relevant for suicidal behavior in pre-pubertal children than for adolescents (Ben-Yehuda et al., 2012; Pfeffer, 1986), while disruptive disorders and attention problems appear to be the strongest predictors of suicidal ideation and self-harm in school-aged (Gould et al., 1998; Kovess-Masfety et al., 2015; Pfeffer, 1986; Wyman et al., 2009). However, no study in young children has differentiated suicidal ideation from self-harm in their analyses (e.g. (Kovess-Masfety et al., 2015; Whalen, Dixon-Gordon, Belden, Barch, & Luby, 2015; Wyman et al., 2009).

Estimates of the number of pre-pubertal children who have suicidal ideation and those with

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self-harm/attempt suicide are difficult because most studies have used collapsed measures of these two outcomes. Chapter Two provides the first such analysis and examines mental health symptoms and child maltreatment in association with increased risk for suicidal ideation and self-harm in 4 and 6-year-old children. Findings support the consensus from studies of adolescents and adults that in children the associations of risk factors such as different types of child maltreatment and mental health symptoms with suicidal ideation and self-harm differ depending on the suicide outcome.

The study in Chapter Three answers key remaining questions regarding developmental risks for suicidal ideation and self-harm in pre-pubertal children by examining whether suicidal youth have encountered more abuse and neglect than their non-suicidal peers, while accounting for other forms of maltreatment and relevant covariates. Analyses also examine whether child maltreatment impacts these two suicidal outcomes via impaired attention regulation, externalizing problems, and anxious/depressive symptoms. These prospectively-measured risk factors have the potential to serve as early warning signs for suicidal behavior in children of this age.

Although numerous studies implicate interpersonal conflicts and losses as short-term risk factors for adolescent suicide attempts, they did not differentiate between adolescents with suicidal ideation and those with an attempt. Diathesis-stress models of suicide risk provide insights into factors which increase the likelihood that these seemingly ordinary incidents such as romantic break-ups become a matter of life or death. Chapter Four examines whether the number of recent stressful life events and certain kinds of life events increase the risk for transitioning from suicidal ideation to suicide attempt in community adolescents. Then, factors which, according to diathesis-stress models of suicide, should increase the risk for suicide attempt from

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stressful life events are tested as moderators. The results have the potential to deepen our understanding of the circumstances in which youth become suicidal and to make clinical assessments more meaningful.

The three papers in this dissertation answer key remaining questions regarding developmental risks for suicidal ideation and self-harm in children and adolescents. Despite the pressing need for the prompt recognition of youth most vulnerable to suicidal thinking and behavior, very few empirical studies provide insight into which factors are related to the early emergence of these behaviors (Glenn & Nock, 2014; O'Connor & Nock, 2014). The findings provide insights that are useful for a more comprehensive conceptual understanding of which youth are most likely to become suicidal and when they are likely to do so. Together, these studies will help focus efforts at prevention and intervention at different stages of development and in more comprehensive ways.

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CHAPTER TWO

CORRELATES AND RISK FACTORS FOR SUICIDAL IDEATION AND SELF-HARM IN EARLY CHILDHOOD IN A COHORT AT-RISK FOR CHILD ABUSE AND NEGLECT

Correlates and Risk Factors for Suicidal Ideation and Self-Harm in Early Childhood in a Cohort
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Abstract

Objectives: This is the first longitudinal study to examine whether different types of child maltreatment, mental health symptoms, and prior suicidal ideation and self-harm are distinctly associated with suicidal ideation and self-harm in young children.

Methods: Participants were children and caregivers assessed at child ages 4 ($n = 1,129$), 6 ($n = 1,218$), and at both waves ($n = 1,090$) from the Longitudinal Studies of Child Abuse and Neglect, a U.S. cohort of children at varying levels of risk for maltreatment or who were already maltreated at the time of study recruitment. Primary caregivers reported on children's suicidal ideation, self-harm, mental health symptoms, and their own maltreating behaviors. Five types of lifetime child maltreatment were also collected from official records and child reports of witnessed violence and depressive symptoms were also used.

Results: Cross-sectional multivariate models for age 4 and age 6 revealed that parent-reported internalizing problems were associated with suicidal ideation, whereas externalizing problems, attentional dysregulation, and the physical neglect subtype failure to provide increased risk for self-harm. Longitudinal results indicated that age 4 suicidal ideation and self-harm were by far the strongest predictors of these respective behaviors at age 6. Failure to provide and attention problems remained significant risk factors for age 6 self-harm.

Conclusion: Our findings support the consensus from studies of adolescents and adults that in children, internalizing difficulties increase risk for suicidal ideation, while externalizing problems and impulse control problems associate with more severe suicidal behaviors.

Correlates and Risk Factors for Suicidal Ideation and Self-Harm in Early Childhood in a Cohort
At-Risk for Child Abuse and Neglect

Suicidal ideation and non-fatal self-harm are the most important predictors of future suicidal behavior (Pfeffer et al., 1991) and suicide death across the life span (Hawton et al., 2015; Soole, Kőlves, & De Leo, 2015). Previously assumed to be too young to inflict serious self-harm, children under the age of 6 have been observed running into fast traffic, jumping from heights, and hanging themselves (Paulson, Stone, & Sposto, 1978; Pfeffer & Trad, 1988; Rosenthal, Rosenthal, Doherty, & Santora, 1986). Understanding children's suicidal ideation and non-fatal self-harm are especially urgent given the significant increases in the rate of child suicides (ages 5-11) that occurred from 1999-2014 in the U.S. (Curtin, Warner, & Hedegaard, 2016).

Data from community samples in children (< 12 years) indicate that current rates of self-report suicidal ideation are as high as 17% (Kovess-Masfety et al., 2015) and 11% for collapsed measures of lifetime suicidal ideation or self-harm reported by parents (Whalen, Dixon-Gordon, Belden, Barch, & Luby, 2015). However, obtaining accurate prevalence rates of young children's self-harm versus their suicidal ideation is difficult because many studies in this age group have collapsed these two phenomena into a single index (Whalen et al., 2015) or only assessed suicidal ideation and not self-harm (Kovess-Masfety et al., 2015). The first aim of this study is to provide 6-month prevalence and persistence data on suicidal ideation and self-harm/suicide attempts at ages 4 and 6 years in a U.S. cohort of children, the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN), selected at baseline for their varying levels of risk for maltreatment.

Identifying factors that differentially associate with suicidal ideation and self-harm in youth is

a research priority (Glenn & Nock, 2014). This study expands on the extant literature by examining how different risk factors (types of maltreatment and mental health symptoms) and prior suicidal ideation and self-harm relate to suicidal ideation and self-harm in at risk young children. Early child adversity and negative life events such as child maltreatment and family conflict are associated with non-fatal suicidal behavior (Miller, Esposito-Smythers, Weismore, & Renshaw, 2013; Serafini et al., 2015) and death by suicide (Sheftall et al., 2016) in children. Theoretical models of suicide risk also emphasize child adversities, such as child maltreatment, as risk factors for suicidal thoughts and behaviors (Bridge, Goldstein, & Brent, 2006; Brodsky, 2016; Turecki & Brent, 2016). However, whether certain types of child maltreatment associate with suicidal ideation or self-harm has not been empirically explored in a young sample, and more longitudinal studies are needed.

That child maltreatment is associated with children's self-harm is supported by earlier reports of preschool-aged suicidal children which describe intense parental aggression, abandonment, family violence, rejection of the child's autonomy (Pfeffer, 1981; Pfeffer & Trad, 1988; Rosenthal & Rosenthal, 1984; Rosenthal et al., 1986). Further underscoring the salience of disturbed parenting for these behaviors, children of preschool (Paulson et al., 1978; Pfeffer & Trad, 1988) and school age (Paulson et al., 1978; Pfeffer, 1981; Wyman et al., 2009) explain their desire for death as a way to deal with feeling unwanted and worthless and to escape unbearable family situations. The patterns of abusive and neglectful parenting contained in these earlier case narratives of suicidal young children are conceptually congruent with emotional maltreatment (Glaser, 2002). That emotional abuse and neglect may be especially relevant for suicidal behaviors comes from a large epidemiologic study of adults (Dube et al., 2001) and a recent meta-analysis of all ages (Liu et al., 2017), which found that among the different types of

abuse and neglect, emotional abuse had the highest risk for suicide attempt. Thus, a further examination of this form maltreatment in relation to suicidal ideation and self-harm in children is warranted.

Despite the theoretical and empirical relevance for suicide risk, only three quantitative studies have explored associations of child maltreatment with suicide outcomes in childhood. In a sample of suicidal preschoolers, 81% and 77% of the outpatient and inpatient children's parents had been abusive and/or neglectful, compared to 25% of same-aged behaviorally disordered outpatients (Rosenthal et al., 1986). The second study used the same data as the current research (LONGSCAN) and found that the presence of any maltreatment reported to Child Protective Services (CPS) was more likely to occur in 8-year-old children who had thought about killing themselves, compared to those who had not (Thompson et al., 2005). Among maltreated children, the severity of physical abuse was associated with suicidal ideation; but maltreatment severity was not significant for any of the other type of maltreatment (e.g. sexual abuse, failure to provide, lack of supervision, and emotional maltreatment). In the third study, low-income school-aged children who were maltreated and had at least one official record of any form of child abuse or neglect were more likely to have reported current suicidal ideation than their non-maltreated peers (Cicchetti, Rogosch, Sturge-Apple, & Toth, 2010). The same study also found that children with three to four forms of child maltreatment were more likely to self-report suicidal ideation than children with no maltreatment or with one to two forms of maltreatment.

Retrospective data from a worldwide epidemiologic study of adults suggests that child physical abuse, sexual abuse, and neglect are related to suicide attempt occurring in childhood (ages 4-12) and adolescence (Bruffaerts et al., 2010). However, no study has explored whether different these types of child maltreatment relate differently to suicidal ideation and self-harm in

children, and none has used a longitudinal approach. The second aim of this paper is to provide the first empirical examination of which types of child maltreatment from two sources, official records and parent reports, are correlates and longitudinal risk factors for suicidal ideation and self-harm/suicide attempts among a cohort of children at risk for maltreatment or who were already identified as maltreated.

In a parallel line of research, a handful of studies have demonstrated the importance of mental health symptoms for suicidal ideation and self-harm in children. The majority of this work has focused either on suicidal ideation or self-harm/suicide attempt or a combined measure of both of these outcomes (Foley, Goldston, Costello, & Angold, 2006; Whalen et al., 2015). For example, in community children aged 3-7, attention deficit hyperactivity disorders (ADHD) and oppositional defiant disorders/conduct disorder, but not depression or anxiety disorders, were significantly related to a combined measure of suicidal ideation and/or self-harm (Whalen et al., 2015). In a large school-based study of children ages 6-12, child reports of their own internalizing distress and externalizing symptoms associated with suicidal ideation, while only parent reports of externalizing symptoms were linked to this outcome (Kovess-Masfety et al., 2015).

Only one study has examined correlates of suicidal ideation and suicide attempt separately in pre-pubertal children. In a school-based sample of children ages 7-12, Gould and colleagues (Gould et al., 1998) found that only disruptive disorders were independently associated with suicidal ideation, whereas mood and anxiety disorders were independent correlates of suicide attempts. Epidemiological studies of adolescents suggest the opposite, and while depression associates with suicidal ideation, disorders that are characterized by physical aggression, anxiety, and substance abuse relate to suicide plan or attempt (Glenn & Nock, 2014). A further reason to

evaluate these outcomes in young children is that even though there are clinical differences in the psychiatric profiles of adolescents and children with suicidal thoughts and behaviors (Ben-Yehuda et al., 2012; Sheftall et al., 2016), many studies have evaluated children and adolescents as one group (Tishler, Reiss, & Rhodes, 2007). There is therefore a need for more understanding of the clinical profiles of young children with suicidal ideation and self-harm behaviors, as they may differ from those of adolescents (Zeanah & Gleason, 2015). Thus, the third aim of this study is to examine whether different mental health symptoms are concurrently elevated in children as young as 4 years old and again at age 6 who talk about suicide and those engaging in self-harm/suicide attempts. We also examine mental health symptoms as risk factors for these two outcomes between data waves.

Finally, another limitation of childhood suicidality literature is in the longitudinal investigation of suicidal trajectories. Pre-pubertal children who talk about or make a suicide attempt are at risk for future repetition and suicide death (Pfeffer et al., 1991; Shaffer, 1974; Soole et al., 2015). Earlier studies have documented repeated self-harm and serious suicide attempts in young children (Paulson et al., 1978; Pfeffer & Trad, 1988; Rosenthal et al., 1986). More recently, Whalen and colleagues (Whalen et al., 2015) found that the majority (75%) of the children who had either lifetime suicidal ideation or self-harm (suicidality) at ages 3-7 were at increased risk for repetition 4 years later. In fact, prior suicidal behavior was a stronger predictor of future suicidality than psychiatric disorders. Research not only on repetition but also on whether there might be transitions from prior suicidal ideation to self-harm/suicide attempts in young children is therefore needed. The fourth and final aim of this study is to provide insights into the longitudinal trajectories of suicidal ideation and self-harm by examining the persistence in these outcomes two years apart, from age 4 to 6, in the same group of young children.

This study is the first to explore how two different sets of risk factors as well as prior suicidal ideation and self-harm relate to suicidal ideation and self-harm/suicide attempts in young children. We fulfill this important objective by conducting secondary analyses of data from the LONGSCAN data, a cohort of children who were already maltreated or who were at risk for maltreatment (Runyan et al., 1998). While prior work with the LONGSCAN data has investigated children's suicidal ideation at the year 8 interview (Thompson et al., 2005), no research on suicidal thoughts and behaviors at earlier ages has been published.

The first study aim is to provide data on prevalence rates and persistence of ages 4 and 6 of suicidal ideation and self-harm. The second aim to examine which types of child maltreatment concurrently relate to suicidal ideation and self-harm at ages 4 and 6, and which age 4 measures longitudinally predict age 6 outcomes. Based on prior work documenting intense parental rejection and emotional neglect in the families of suicidal children (Pfeffer, 1981; Rosenthal & Rosenthal, 1984), we hypothesize that emotional/psychological abuse and neglect, will show significant relationships with both outcomes. In concordance with prior work (Cicchetti et al., 2010; Thompson et al., 2005), we expect more types of maltreatment to associate with suicidal ideation. The third aim is to examine whether mental health symptoms relate differentially to suicidal ideation and self-harm in young children. We expect internalizing and externalizing symptoms to be associated with suicidal ideation (Kovess-Masfety et al., 2015) and internalizing symptoms with self-harm (Gould et al., 1998). The forth aim is to examine the longitudinal trajectories of suicidal ideation and self-harm from ages 4 to 6. We expect both stability (Whalen et al., 2015) and a transition from suicidal ideation to self-harm between assessments. Gaining a clearer understanding of suicidal children's early maltreatment experiences, mental health symptoms, and progression over time will help tailor prevention and intervention efforts directed

at children.

Method

Sample

The present study is a secondary analysis of data from the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN), a consortium of five studies sites in different regions in the U.S. (South, East, Midwest, Northwest, and Southwest) that share common methodology and measures. Children at each study site were chosen based on varying degrees of risk for maltreatment, from at risk families recruited from health-care clinics (e.g. failure to thrive children, or low-income, or mothers at risk for HIV infection), to families reported to Child Protective Services (CPS) and maltreated children placed in foster care. LONGSCAN started collecting data in 1991 and first assessed children when they were 4 years old.

Informed consent was obtained from the caregivers. Assessments were administered by trained interviewers and financial compensation was provided for participation. For a detailed description of the LONGSCAN methods and procedures used, see Runyan and colleges (1998). Because suicidal ideation and self-harm occur at low base rates, we used three study samples in order to retain as many children with these two outcomes as possible. Therefore, we report on (cross-sectional) correlates of ages 4 ($n = 1,129$) and 6 (1,218) suicidal ideation and self-harm in what we refer to as the age 4 and age 6 samples, respectively. Longitudinal predictors of age 6 suicide outcomes are based on the longitudinal sample ($n = 1,090$). The selection process for all three is described in more detail below.

At age 4, 1,120 caregivers completed the instrument from which our two dependent variables

came, Child Behavior Checklist 4/18 (Achenbach, 1991). Of these, only one participant was missing data on one of the outcome variables, leaving 1,219 caregivers with complete age 4 outcome data. Of these, 84 were missing data on maternal depression symptoms. None of the other age 4 study variables were missing data. These included CBCL scores, demographics, and LONGSCAN- coded child maltreatment from official records. Caregivers with missing age 4 depression data were more likely to have been reported to CPS for at least one allegation of emotional maltreatment (34.5%), compared to caregivers without missing depression data (21.9%, $\chi^2(1) = 7.037, p = 0.008$).

At age 6, of the 1,221 caregivers were administered the CBCL 4/18 (Achenbach, 1991), 1,218 had complete data on age 6 suicidal ideation and self-harm. Proportions of age 6 missing data ranged from child vocabulary (12.79%) to caregiver reported psychological aggression (5.50%) and minor physical assault (5.50%), towards the child. Because the longitudinal study sub-sample ($n = 1,090$) examined age 6 outcomes with age 4 predictors, missingness was only present for age 4 caregiver depression (6.97%). The 257 participants who were part of either the age 4 or age 6 study samples but not the longitudinal sample did not differ from the included 1,090 on any study variables. In order to preserve the participants with complete outcome data but missing data on other study variables, multiple imputation with chained equations was used within each of the three study samples. The resulting 10 data sets were averaged for each sample and were used in all presented analyses. We therefore did not impute outcome data at either wave.

Individuals with missing data were slightly older (6.49 yrs. vs. 6.41 yrs., $t_{1235} = 1.69, p = .003$), had lower Parent-Child Conflict Tactics Scales physical assault scores (1.14 vs. 1.40, $t_{1151} = -1.89, p = .004$), and more Child Protective Services (CPS) allegations of emotional abuse

(0.57 vs. .47, $t_{1352} = 1.33$, $p = .028$) and failure to provide (1.60 vs. 1.22, $t_{1352} = 2.39$, $p < .000$). To assess the potential impact of missingness on results, we compared analyses on the study sample to the sample with missing data and the final pattern of multivariate results did not differ from those reported in this paper. Almost 65% of the informants were biological mothers, 8.0% grandmothers, 6.5% adoptive mothers, 4.3% foster mothers, 5.4% other female (e.g. aunt), 3.2% biological fathers, and the remaining 7.6% were other female or male caregivers, either adoptive or other biological relatives.

Measures

Child suicidal behaviors. Suicidal ideation and self-harm during the past 6 months were measured with two items from the Child Behavior Checklist (CBCL/4-16; (“*Child talks about killing self*” and “*Child deliberately harms self/attempts suicide*”). Caregivers rated these two items on a scale rating from 0 (*not true*) to 2 (*often true*) when children were 4 and 6 years old. Prior studies provide evidence for the clinical utility and construct validity of these two CBCL items. In a large longitudinal community-based study of 11 year old children, the suicidal ideation item from the CBCL was strongly predictive of suicidal ideation, mood disorder, and anxiety disorder in adulthood (Herba, Ferdinand, van der Ende, & Verhulst, 2007). Another longitudinal study that involved 16- year old adolescents combined parent (CBCL) and youth reports (from youth on the CBCL companion version, the Youth Behavior Checklist) on a collapsed measure of both items (“suicidality”) used in the current study. Adolescents with any suicidality at age 16 had significantly higher concurrent levels of internalizing and externalizing problems. Children’s reports of their own depressive symptoms at age 8 were also predictive of their suicidality measure at age 16 (Sourander, Helstelä, Haavisto, & Bergroth, 2001).

Parent-reported child mental health symptoms. Children's mental health symptoms at the ages 4 and 6 interviews were measured with the following CBCL (Achenbach, 1991) scores: Externalizing Problems (consisting of the 20-item Aggression and 13 item Delinquent Behavior subscales), Attention Problems (11 items), and Internalizing Problems (consisting of 14 Depression/Anxiety items, 9 Somatic Complaint items, and 9 Withdrawn items). The suicidal ideation and self-harm variables were not part of any of these subscales. The CBCL is widely used and has good test-retest reliability, interrater agreement, and construct validity (Achenbach, 1991). Caregivers rate the frequency of their children's problem behaviors during the prior 6 months on a Likert-type scale from 0 (*not true*) to 2 (*very or often true*). Internal reliability for each of the subscales in this sample was good at both ages (Cronbach's $\alpha = .76-.90$). As recommended by the instrument author (Achenbach, 1991), age-standardized T scores ($M = 50$, $SD = 10$) were used in analyses. For the Internalizing and Externalizing Problems scales, T scores above 63 are in the clinical range, and scores above 70 on Attention Problems are in the clinical range.

Child-reported mental health symptoms. Children reported on their own depressive symptoms using the 25-item pictorial Preschool Symptom Self-Report (PRESS) (Martini, Strayhorn, & Puig-Antich, 1990) when they were 4 years old and again at age 6. For each of item, children are presented with two illustrations; one depicting the symptom or problem, the other illustrating the absence of the symptom. Children choose which picture is most like him or her. Exemplar items include feeling sad and feeling bad about oneself. Endorsed items were coded 1 = yes and 0 = no and summed, so that a higher score indicates more depressive symptoms. Test-retest reliability and internal consistency were reported as good by the study authors (Martini et al., 1990) (Cronbach's alphas = .82 & .84).

Child maltreatment, official reports. At both time points, child maltreatment variables were comprised of maltreatment allegations reported to the Child Protective Services (CPS) until the child was ages 4 and 6. Official records were coded by trained abstractors at each study site (English, LONGSCAN investigators, & others, 1997). In this study, we examined emotional maltreatment (persistent or extreme thwarting of the child's emotional needs), physical abuse (inflicted blows or injury to the body), sexual abuse (sexual exposure, molestation, or penetration), and two forms of physical neglect: lack of adequate supervision (failure to ensure the child's safety in or out of the home) and failure to provide (e.g. not supplying the child with adequate food, clothing, shelter, or health care). Preliminary analyses indicated that the continuous maltreatment variables, or the count of the number of allegations of each time were skewed. Because we planned to use logistic regressions for statistical analyses, dichotomous variables were created for each maltreatment type, where 1 = at least one CPS allegation of that maltreatment type and 0 = zero allegations of that type. To create the number of types of maltreatment variable, these indicators were summed.

Child maltreatment, parent reports. Maltreatment was measured at age 6 with the Psychological Aggression (6 items) and Minor Physical Assault (6 items) subscales from the Parent-Child Conflict Tactics Scales (CTS) (Straus, Hamby, Finkelhor, Moore, & Runyan, 1998), which were collected from caregivers when the children were age 6. The Psychological Aggression subscale includes items such as yelling and screaming or insulting and swearing at the child. The Minor Physical Assault subscale includes items such as throwing something at or grabbing the child. Both subscales inquire about frequency of behaviors in the last year on a scale from 0 (*never*) to 4 (*> 5 times*). For these analyses, items within each subscale were dichotomized into 0 (*never*) and 1 (*once or more*) and summed into frequency

scales. Internal consistency was acceptable for both the Psychological Aggression and Minor Physical Assault subscales (Cronbach's $\alpha = .70$ and $.60$, respectively). Construct validity of the CTS has been previously demonstrated (Straus & Hamby, 1997). LONGSCAN study investigators did not administer the CTS to all study sites until the age 6 interview, so only CTS data from age 6 are included in the present study.

Family conflict. Primary caregivers completed the Self-Report Family Inventory (SFI) (Beavers, Hampson, & Hulgus, 1990). Respondents rated each of the 36 items on a scale from 1 (fits our household very well) to 5 (does not fit our household at all). In this study, the 12 item Family Conflict subscale was used. Exemplar items included "Grownups in the household compete and fight with each other" and "Household members put each other down". Test-retest reliability for the Family Conflict scale was reported by the authors as good (0.50 to 0.59) (Beavers et al., 1990). Convergent and concurrent validity were also shown via comparisons to similar instruments (Beavers et al., 1990; Beavers & Voeller, 1983). In this study, items were summed and higher values indicate more family conflict (Cronbach's $\alpha = .81$).

Child-reported witnessed violence. At age 6, children responded to the 20-item Things I Have Seen and Heard (Richters & Martinez, 1990) measure to assess their exposure to violence. The instrument was developed for children in Grades 1 and 2 and uses pictures to aid comprehension. Children selected pictures to indicate how many times they had witnessed each violent event (0 = *never* to 4 = *many times*). Test-retest reliability after one week was reported by the authors as ($r = .81$) (Richters & Martinez, 1993). Concurrent validity (Richters & Martinez, 1990) and construct validity have been demonstrated (Martinez & Richters, 1993). In this study, 17 items which directly inquired about witnessed violence were dichotomized (1 = present and 0 = absent) and summed so that higher scores indicate more witnessed violence (Cronbach's $\alpha = .77$).

Covariates. Child socio-demographic measures were collected from primary caregivers at baseline and include gender, age, and race/ethnicity (non-Hispanic White, African American/Black, and Hispanic/multiracial/other). Child age in months was calculated by subtracting the child's date of birth from the interview date. Children's vocabulary was assessed at age 6 with the Wechsler Preschool and Primary Scale of Intelligence -Revised (WPPSI-R):Short Form Vocabulary and Block Design (Wechsler, 1989). The WPPSI-R is a test of intellectual functioning for children ages 3 to 7 years. In the first vocabulary section, children are asked to provide names for pictures of objects. Then, children are asked to define a word which the experimenter has orally presented. In this study, age-standardized scores will be used. The WPPSI-R has been used extensively and construct validity has been demonstrated (Canivez & Watkins, 1998; Wechsler, 1989).

Primary caregiver depressive symptoms were measured with the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977) when children were 4 and 6 years old. This scale measures frequency of depressive symptoms in the last week (*0 = rarely or none of the time*, to *3 = most or all of the time*). The total score was calculated by summing the 20 items. The CES-D has well-documented construct validity and reliability (Knight, Williams, McGee, & Olaman, 1997; Radloff, 1977), and internal consistencies were high in this sample (Cronbach's $\alpha = .85$ & $.82$). A score of 16 or higher indicates the cut-off point for high depressive symptoms (Radloff, 1977). A nominal variable was used to control for varying recruitment practices at each of the five LONGSCAN study sites.

Statistical analyses

First, we reported the 6-month prevalence rates of suicidal ideation and self-harm at ages 4

and 6 as well as associations between these variables across waves to estimate persistence. Then, cross-sectional associations between covariates, child maltreatment, and child mental health variables were computed for age 4 and then age 6 outcomes. In these analyses, suicidal outcomes were dichotomized into present (1) versus absent (0). For example, the case group for age 6 suicidal ideation included children with any age 6 suicidal ideation. For self-harm, children with any age 6 self-harm served as the case group. At each age, means and proportions on all study variables were compared for children with neither suicidal ideation nor self-harm versus those with suicidal ideation, and then the former group to children with self-harm. Exponentiated coefficients from binary logistic regressions were used to report the size of these concurrent relationships at each wave. Variables with statistical significance of $p < 0.05$ in these bivariate analyses were retained for subsequent multivariate analyses.

Second, age 4 covariates, child maltreatment, child mental health symptoms, and suicidal ideation and self-harm were used to longitudinally predict age 6 suicidal ideation and self-harm. As with the cross-sectional analyses, the comparison group was comprised of children with neither suicidal ideation nor self-harm ($n = 1,028$). Only multivariate modeling was conducted for the longitudinal analyses. Statistical tests were two-tailed. Regression coefficients were transformed into odds ratios (ORs) for ease of interpretation and 95% confidence intervals (CIs) are reported. Stata (StataCorp., 2015) was used for data analyses.

Results

Prevalence and Persistence of Suicidal Ideation and Self-Harm/Suicide Attempts

The 6-month prevalence of suicidal ideation and self-harm at age 4 were as follows. When the LONGSCAN children were 4 years old, 1.6% ($n = 19$) of children had talked about killing

themselves. Only one of these children had done so “often”, and the remaining children had talked about it “sometimes”. More 4-year olds had self-harmed/attempted suicide: 3.8% ($n = 46$) had self-harmed/attempted suicide at least once, and 23.9% ($n = 11$) of these children had done so “often”. At age 6, nearly twice as many children (3.2%; $n = 38$) had talked about suicide than at age 4, but only 2 of these 6-year-old children had talked about suicide “often”. An approximately equal number (3.1%; $n = 37$) of 6-year olds had self-harmed/attempted suicide at least once: 21.2% ($n = 8$) “often” and 78.4% ($n = 29$) “sometimes”. Only 3 and 8 children had both suicidal ideation and self-harm/suicide attempts at ages 4 and 6, respectively.

Next, we examined the persistence of suicidal ideation and self-harm/suicide attempts from age 4 to 6 in the longitudinal sub-sample of children with data at both of these time points ($n = 1,090$). Suicidal behavior variables were dichotomized for these analyses. Strong evidence was found for the persistence of each outcome, but not for a progression from one to the other. Specifically, age 4 suicidal ideation strongly predicted suicidal ideation two years later ($\chi^2 = 46.25, p < 0.0001$), but did not predict self-harm/suicide attempt ($\chi^2 = 2.37, p = 0.222$) at follow-up. Similarly, age 4 self-harm/suicide attempt increased the risk for this outcome ($\chi^2 = 87.48, p < 0.0001$), but not for suicidal ideation ($\chi^2 = 1.38, p = 0.231$) two years later. These proportions corresponded to 5 of the 15 children with age 4 ideation in the age 6 ideation group and 12 of the 43 children with age 4 self-harm/suicide attempts having this outcome at age 6.

Table 2.1

Correlates of 4-Year Old Children with Parent Reports of Neither Suicidal Ideation nor Self-Harm, Suicidal Ideation, or Self-Harm in the Longitudinal Studies of Child Abuse and Neglect (LONGSCAN) (n = 1, 219)

| Variable (sample range) | Neither n = 1,157 % or M (SD) | Suicidal ideation n = 19 % or M (SD) | OR (95% CI) | Self-harm n = 46 % or M (SD) | OR (95% CI) |
|---|-------------------------------------|--|-------------------------|------------------------------------|-------------------------|
| Socio-demographics | | | | | |
| Gender, female | 51.94 % | 42.11 % | 0.67 (0.27-1.68) | 36.96 % | 0.54 (0.29-1.00) |
| Child age in years (3.75-7.58) | 4.57 (0.70) | 4.92 (0.78) | 1.05 (1.00-1.10) | 4.46 (0.61) | 0.98 (0.93-1.02) |
| Child race/ethnicity | | | | | |
| Non-Hispanic White | 26.71 % | 26.32 % | 1.00 | 28.26 % | 1.00 |
| African American/Black | 52.90 % | 47.37 % | 0.91 (0.30-2.74) | 39.13 % | 0.70 (0.34-1.45) |
| Hispanic/mixed race/other | 20.40 % | 26.32 % | 1.31 (0.37-4.58) | 32.61 % | 1.51 (0.71-3.24) |
| Caregiver depressive symptoms (0-59) | 12.27 (10.53) | 23.95 (14.10) | 1.08 (1.04-1.11) | 15.33 (14.65) | 1.02 (1.00-1.05) |
| CPS child maltreatment, lifetime | | | | | |
| Emotional maltreatment | 22.39 % | 5.26 % | 0.19 (0.03-1.45) | 41.30 % | 2.44 (1.34-4.46) |
| Physical abuse | 20.14 % | 15.79 % | 0.74 (0.21-2.57) | 39.13 % | 2.55 (1.39-4.69) |
| Failure to provide | 39.67 % | 31.58 % | 0.70 (0.26-1.86) | 65.22 % | 2.85 (1.54-5.29) |
| Lack of supervision | 27.05 % | 26.32 % | 0.96 (0.34-2.70) | 45.65 % | 2.27 (1.25-4.10) |
| Sexual abuse | 7.87 % | 5.26 % | 0.65 (0.09-4.93) | 6.53 % | 0.82 (0.25-2.69) |
| Number of types of maltreatment (0-5) | 1.17 (1.36) | 0.84 (1.17) | 0.81 (0.55-1.20) | 1.98 (1.16) | 1.46 (1.20-1.76) |
| CBCL mental health, age 4 | | | | | |
| Externalizing (30-89) | 54.71 (10.39) | 63.74 (9.07) | 1.09 (1.04-1.14) | 67.89 (9.22) | 1.14 (1.10-1.18) |
| Attention problems (50-97) | 55.01 (6.82) | 59.05 (7.08) | 1.06 (1.01-1.12) | 65.41 (11.15) | 1.12 (1.09-1.16) |
| Internalizing (33-80) | 48.67 (9.12) | 59.21 (11.60) | 1.12 (1.07-1.18) | 57.46 (10.58) | 1.10 (1.07-1.14) |
| PRESS depression symptoms, age 4 (0-24) | 5.75 (4.01) | 5.25 (4.46) | 0.97 (0.86-1.09) | 5.65 (3.52) | 0.99 (0.92-1.07) |

Note. CPS = Child Protective Services allegations, CBCL = Child Behavior Checklist. Clinical cut-offs for CBCL scores are:

Externalizing = 63, Attention = 70, and Internalizing = 63. Bold indicates $p < 0.05$. Children with neither suicidal ideation nor self-harm served as the reference group in all models.

Correlates of Age 4 Suicidal Ideation and Self-Harm/Suicide Attempts

Table 2.1 compares characteristics of 4-year old children in the comparison group (neither suicidal ideation nor self-harm) to those with suicidal ideation, and then to children with self-harm using bivariate logistic regressions. Four-year-olds with suicidal ideation were slightly older, had caregivers with more depressive symptoms, significantly higher scores on parent-reported externalizing problems, attention problems, and internalizing symptoms, relative to the comparison group. Children in each of the suicidal outcome groups had average levels of externalizing behaviors which exceeded the clinical threshold of 63. No other variables, including child maltreatment, were associated with age 4 suicidal ideation. A different pattern of results was found for children's age 4 self-harm/suicide attempts. While caregiver depressive symptoms, parent-reported externalizing problems, attention problems, and internalizing problems were also higher in this group relative to children with no suicidal thoughts or behaviors, the self-harm/suicide attempts group had significantly greater proportions of all maltreatment types and had experienced more types of maltreatment except for sexual abuse. The largest association was with the physical neglect subtype failure to provide, which was associated with nearly a 3-fold likelihood for age 4 self-harm/suicide attempt.

Table 2.2

Multivariate Concurrent Associations of Child Maltreatment and Child Mental Health Symptoms on Age 4 Suicidal Ideation and Self-harm (n = 1,219)

| | Suicidal ideation | | Self-harm | |
|-------------------------------|-------------------------|--------------|-------------------------|-------------------|
| | AOR (95% CI) | p-value | AOR (95% CI) | p-value |
| Model 1 | | | | |
| Age | 1.03 (0.98-1.09) | 0.177 | - | |
| Caregiver depressive symptoms | 1.05 (1.01-1.09) | 0.011 | - | |
| Externalizing | 1.04 (0.97-1.11) | 0.264 | - | |
| Attention problems | 0.97 (0.90-1.04) | 0.438 | - | |
| Internalizing | 1.08 (1.01-1.15) | 0.028 | - | |
| Model 2 | | | | |
| Caregiver depressive symptoms | - | | 1.02 (1.00-1.05) | 0.049 |
| Emotional maltreatment | - | | 1.37 (0.68-2.79) | 0.381 |
| Physical abuse | - | | 1.62 (0.80-3.25) | 0.178 |
| Failure to provide | - | | 2.21 (1.11-4.42) | 0.024 |
| Lack of supervision | - | | 1.22 (0.61-2.45) | 0.570 |
| Model 3 | | | | |
| Caregiver depressive symptoms | - | | 1.02 (1.00-1.05) | 0.059 |
| Nr. types of maltreatment | - | | 1.46 (1.20-1.77) | < 0.001 |
| Model 4 | | | | |
| Caregiver depressive symptoms | - | | 0.99 (0.96-1.02) | 0.407 |
| Externalizing | - | | 1.10 (1.05-1.15) | < 0.001 |
| Attention problems | - | | 1.06 (1.02-1.10) | 0.005 |
| Internalizing | - | | 1.00 (0.96-1.05) | 0.865 |

Note. CI = confidence interval, AOR = adjusted odds ratio. Children with neither suicidal ideation nor self-harm served as the reference group in all models. Only variables which were significant at the $p < 0.05$ level in bivariate analyses (Table 2.1) were included in multivariate models.

Multivariate Concurrent Associations with Age 4 Suicidal Ideation and Self-Harm/Suicide Attempts

Next, we examined multivariate relationships between correlates identified in the last step as significant at the $p < 0.05$ level all child maltreatment and then child mental health variables with age 4 suicidal behavior variables while accounting for significant covariates (Table 2.2). Once covariance between concurrent child mental health variables was accounted for, only internalizing problems and caregiver depressive symptoms remained associated with age 4 suicidal ideation (Model 1). In Model 2 for age 4 self-harm/suicide attempts, the only significant form of maltreatment was failure to provide, which conferred more than 2-fold likelihood of being in the case group. Caregiver depressive symptoms also remained significant, even when accounting for maltreatment variables. More types of maltreatment were also significantly higher in this group (Model 3), compared to children with neither suicidal outcome. Finally, externalizing problems and attention problems remained elevated in the multivariate model for age 4 self-harm/suicide attempt, with the former showing a slightly stronger association (Model 4). Together, these findings suggest that internalizing symptoms may be a marker of risk for young children's suicidal ideation, while externalizing problems and attentional dysregulation may be indicators of self-harm/suicide attempts at this young age.

Table 2.3

Correlates of Age 6 Suicidal Ideation and Self-Harm in the Longitudinal Studies of Child Abuse and Neglect (n = 1, 218)

| Variable (sample range) | Neither n = 1,151 | Suicidal ideation n = 38 | | Self-harm n = 37 | |
|--|----------------------|-----------------------------|-------------------------|---------------------|-------------------------|
| | % or M (SD) | % or M (SD) | OR (95% CI) | % or M (SD) | OR (95% CI) |
| Socio-demographics | | | | | |
| Gender, female | 51.52 % | 42.11 % | 0.68 (0.36-1.32) | 43.24 % | 0.72 (0.37-1.39) |
| Child age in years (5.15-8.98) | 6.43 (0.52) | 6.41 (0.47) | 0.96 (0.51-1.80) | 6.27 (0.45) | 0.48 (0.22-1.07) |
| Child race/ethnicity | | | | | |
| Non-Hispanic White | 25.54 % | 44.74 % | 1.00 | 18.92 % | 1.00 |
| African American/Black | 54.91 % | 26.32 % | 0.27 (0.12-0.60) | 43.24 % | 1.06 (0.43-2.61) |
| Hispanic/mixed race/other | 19.55 % | 28.95 % | 0.85 (0.39-1.84) | 37.84 % | 2.61 (1.04-6.58) |
| Child vocabulary, age 6 (1-18) | 8.40 (2.97) | 8.61 (3.24) | 1.02 (0.92-1.14) | 6.85 (3.01) | 0.84 (0.75-0.94) |
| Caregiver depressive symptoms (0-56) | 11.77 (10.23) | 19.93 (13.07) | 1.06 (1.03-1.08) | 13.25 (12.61) | 1.01 (0.98-1.04) |
| Family conflict (12-60) | 20.37 (7.61) | 23.93 (9.12) | 1.05 (1.01-1.09) | 20.27 (7.21) | 1.00 (0.96-1.04) |
| CTS child maltreatment, past year | | | | | |
| Psychological aggression (0-6) | 2.30 (1.30) | 3.13 (1.55) | 1.55 (1.23-1.95) | 2.44 (1.47) | 1.08 (0.85-1.39) |
| Physical assault (0-6) | 1.38 (1.14) | 1.94 (1.33) | 1.43 (1.13-1.81) | 1.61 (1.21) | 1.18 (0.91-1.54) |
| CPS child maltreatment, lifetime | | | | | |
| Emotional maltreatment | 24.07 % | 44.74 % | 2.55 (1.33-4.91) | 37.84 % | 1.92 (0.97-3.78) |
| Physical abuse | 22.76 % | 39.47 % | 2.12 (1.14-4.30) | 29.73 % | 1.44 (0.70-2.94) |
| Failure to provide | 42.48 % | 60.53 % | 2.08 (1.07-4.02) | 62.16 % | 2.22 (1.13-4.37) |
| Lack of supervision | 32.15 % | 52.63 % | 2.35 (1.23-4.49) | 37.84 % | 1.28 (0.65-2.53) |
| Sexual abuse | 10.60 % | 18.42 % | 1.90 (0.82-4.42) | 5.41 % | 1.32 (0.50-3.45) |
| Number of types of maltreatment (0-5) | 1.33 (1.42) | 2.16 (1.53) | 1.44 (1.17-1.77) | 1.81 (1.63) | 1.25 (0.50-3.45) |
| Child reports of witnessed violence (0-16) | 8.93 (3.51) | 8.83 (3.16) | 0.99 (0.90-1.09) | 8.91 (3.79) | 1.00 (0.91-1.19) |
| CBCL mental health, age 6 | | | | | |
| Externalizing (30-86) | 54.73 (10.64) | 66.29 (7.44) | 1.12 (1.08-1.15) | 66.30 (10.75) | 1.11 (1.07-1.15) |
| Attention problems (50-95) | 56.22 (7.73) | 64.95 (8.91) | 1.10 (1.07-1.13) | 68.43 (11.15) | 1.12 (1.09-1.16) |
| Internalizing (33-85) | 50.33 (9.48) | 63.58 (7.96) | 1.15 (1.11-1.20) | 60.05 (11.45) | 1.11 (1.07-1.14) |
| PRESS depression symptoms, age 6 (0-24) | 3.20 (3.08) | 3.46 (2.89) | 1.03 (0.93-1.13) | 4.71 (4.03) | 1.11 (1.03-1.20) |

Note. CTS = Conflict Tactics Scale, past year, CPS = Child Protective Services lifetime allegations, CBCL = Child Behavior Checklist. Clinical cut-offs for CBCL scores are: Externalizing = 63, Attention = 70, and Internalizing = 63. PRESS = Preschool

Symptom Self-Report. CI = confidence interval, OR = adjusted odds ratio. Children with neither suicidal ideation nor self-harm served as the reference group in all models. Bold indicates $p < 0.05$.

Correlates of Age 6 Suicidal Ideation and Self-Harm/Suicide Attempts

Next, we compared characteristics of 6-year old children with neither suicidal outcome to children with suicidal ideation and then to those with self-harm using bivariate logistic regressions (Table 2.3). These results indicated no differences by child gender and age in either suicide outcome. African American/Black were significantly less likely than non-Hispanic White children to have talked about killing themselves, while the Hispanic/mixed race/other group had higher rates of self-harm/suicide attempt than non-Hispanic White children. Caregiver depressive symptoms were also associated with suicidal ideation, but not self-harm. Children with self-harm/suicide attempts had significantly lower vocabulary levels than those in the comparison group.

Except for sexual abuse, all other types of child maltreatment, a greater number of types of maltreatment, more family conflict, and caregiver depressive symptoms were higher in children with age 6 suicidal ideation, compared to those with neither suicidal outcome. Emotional maltreatment and lack of supervision had the strongest associations with age 6 suicidal ideation, conferring 2.55 and 2.35 times the likelihood, respectively. Different maltreatment results were found for age 6 self-harm, where at least one CPS allegation of failure to provide was the only form of maltreatment that was significantly higher in the self-harm/suicide attempts group, relative to controls. Differences in mental health symptom correlates were as expected. All age 6 parent-reported mental health symptoms were significantly elevated among children with self-harm or suicidal ideation, compared to the children with neither outcome. Surprisingly, children's own accounts of their depressive symptomatology was associated with self-harm/suicide attempts, but not with suicidal ideation.

Table 2.4

Multivariate Concurrent Associations of Child Maltreatment and Child Mental Health Symptoms with Age 6 Suicidal Ideation and Self-harm (n = 1,218)

| | Suicidal ideation | | Self-harm | |
|---------------------------------|-------------------------|-------------------|-------------------------|--------------|
| | AOR (95% CI) | p-value | AOR (95% CI) | p-value |
| Model 5 | | | | |
| Caregiver depressive symptoms | 1.06 (1.03-1.09) | 0.001 | - | |
| Family conflict | 0.99 (0.95-1.04) | 0.707 | - | |
| CTS psychological aggression | 1.31 (1.02-1.67) | 0.030 | - | |
| Emotional maltreatment | 1.30 (0.58-2.92) | 0.504 | - | |
| Physical abuse | 1.24 (0.56-2.72) | 0.603 | - | |
| Failure to provide | 1.41 (0.65-3.06) | 0.406 | - | |
| Lack of supervision | 1.47 (0.68-3.20) | 0.301 | - | |
| Model 6 | | | | |
| Caregiver depressive symptoms | 1.06 (1.03-1.09) | < 0.001 | - | |
| Family conflict | 1.01 (0.96-1.05) | 0.793 | - | |
| Number of types of maltreatment | 1.31 (1.05-1.62) | 0.015 | - | |
| Model 7 | | | | |
| Caregiver depressive symptoms | 1.03 (1.00-1.07) | 0.057 | - | |
| Family conflict | 0.98 (0.93-1.02) | 0.323 | - | |
| Externalizing | 1.04 (0.99-1.10) | 0.093 | - | |
| Attention problems | 1.01 (0.97-1.06) | 0.545 | - | |
| Internalizing | 1.10 (1.05-1.16) | <0.001 | - | |
| Model 8 | | | | |
| Child vocabulary | - | | 0.85 (0.76-0.95) | 0.004 |
| Failure to provide | - | | 2.01 (1.01-3.99) | 0.046 |
| Model 9 | | | | |
| Child vocabulary | - | | 0.89 (0.79-1.00) | 0.058 |
| Externalizing | - | | 1.04 (0.99-1.09) | 0.100 |
| Attention problems | - | | 1.07 (1.03-1.12) | 0.002 |
| Internalizing | - | | 1.03 (0.98-1.08) | 0.227 |
| PRESS depression symptoms | - | | 1.05 (0.96-1.14) | 0.273 |

Note. CTS = Conflict Tactics Scale, past year, CBCL = Child Behavior Checklist. Clinical cut-offs for CBCL scores are: Externalizing = 63, Attention = 70, and Internalizing = 63. PRESS = Preschool Symptom Self-Report. CI = confidence interval, OR = adjusted odds ratio. Children with neither suicidal ideation nor self-harm served as the reference group in all models. Bold indicates $p < 0.05$.

Multivariate Concurrent Associations with Age 6 Suicidal Ideation and Self-Harm/Suicide Attempts

Next, age 6 correlates which were significantly associated with age 6 suicide outcomes were examined in multivariate models (Table 2.4). Because the two parent-reported child maltreatment variables were highly correlated ($r = 0.57$), Model 5 was conducted twice, once with the psychological aggression variable and once with the physical assault variable. Only psychological aggression was significant and these results are shown. In this first multivariate model for suicidal ideation (Model 5), caregiver depressive symptoms and psychological aggression remained significantly associated with age 6 suicidal ideation, but other child maltreatment variables and family conflict did not. Children with more types of CPS child maltreatment by their 6th birthdays and caregivers with higher depressive symptoms continued to be at higher risk for suicidal ideation (Model 6). Once covariance between mental health variables was accounted for, only children's internalizing symptoms as reported by their parents associated with higher odds of age 6 suicidal ideation (Model 7). In Model 8, CPS failure to provide was associated with 2.01 higher odds of age 6 self-harm/suicide attempts, and children in this case group continued to have lower vocabulary scores. Finally, elevated attention problems associated with 1.07 higher odds of self-harm/suicide attempt even when accounting for other mental health variables and child vocabulary level (Model 9). Together, these results suggest differences in the maltreatment experiences and concurrent mental health symptomatology in children with either suicidal outcome compared to children with neither outcome.

Table 2.5

Multivariate Longitudinal Prediction of Age 6 Suicidal Ideation and Self-Harm from Age 4 Child Maltreatment, Age 4 Child Mental Health Symptoms, and Age 4 Self-Harm (n = 1,090)

| | Suicidal ideation | | Self-harm | |
|-------------------------------|---------------------------|------------------|-------------------------|-------------------|
| | AOR (95% CI) | p-value | AOR (95% CI) | p-value |
| Child maltreatment | | | | |
| Caregiver depressive symptoms | 1.03 (1.00-1.06) | 0.032 | 1.01 (0.98-1.04) | 0.496 |
| Emotional maltreatment | 1.46 (0.63-3.40) | 0.382 | 1.94 (0.63-3.40) | 0.115 |
| Physical abuse | 1.04 (0.44-2.45) | 0.936 | 0.95 (0.40-2.30) | 0.917 |
| Failure to provide | 1.40 (0.65-3.02) | 0.396 | 2.22 (1.03-4.76) | 0.041 |
| Lack of supervision | 0.78 (0.34-3.11) | 0.564 | 0.59 (0.25-1.38) | 0.222 |
| Sexual abuse | 1.02 (0.33-3.11) | 0.974 | 0.42 (0.09-1.90) | 0.262 |
| Child maltreatment | | | | |
| Caregiver depressive symptoms | 1.03 (1.00-1.06) | 0.039 | 1.01 (0.98-1.04) | 0.613 |
| Nr. types of maltreatment | 1.12 (0.88-1.43) | 0.346 | 1.18 (0.92-1.51) | 0.196 |
| Child mental health | | | | |
| Caregiver depressive symptoms | 1.01 (0.98-1.04) | 0.486 | 0.99 (0.96-1.02) | 0.531 |
| Externalizing | 1.02 (0.98-1.07) | 0.349 | 1.02 (0.98-1.07) | 0.349 |
| Attention problems | 1.00 (0.95-1.05) | 1.000 | 1.00 (0.95-1.05) | 1.000 |
| Internalizing | 1.04 (0.99-1.10) | 0.082 | 1.04 (0.99-1.10) | 0.082 |
| Child mental health | | | | |
| Caregiver depressive symptoms | 1.01 (0.98-1.05) | 0.492 | 0.99 (0.95-1.02) | 0.492 |
| Externalizing | 1.02 (0.97-1.07) | 0.453 | 1.05 (1.00-1.10) | 0.062 |
| Attention problems | 0.99 (0.94-1.05) | 0.788 | 1.08 (1.02-1.13) | 0.005 |
| Internalizing | 1.05 (1.00-1.10) | 0.076 | 0.94 (0.90-0.99) | 0.024 |
| Suicidal ideation | 12.67 (3.74-42.95) | <0.001 | - | - |
| Self-harm | - | - | 7.16 (2.72-18.81) | <0.0001 |

Note. CI = confidence interval, AOR = adjusted odds ratio. Children with neither suicidal ideation nor self-harm served as the reference group in all models.

Longitudinal Prediction of Age 6 Suicidal Ideation and Self-Harm/Suicide Attempts

Longitudinal relationships between age 4 child maltreatment and mental health variables and age 6 suicidal outcomes are presented in Table 2.5. Congruent with what was found in relation to age 4 suicidal ideation, none of the early childhood (birth to age 4) CPS maltreatment measures

(type nor number of types) longitudinally predicted age 6 suicidal ideation. However, caregiver depressive symptoms in the maltreatment models resulted in elevated risk for suicidal ideation in children two years later. However, this association disappeared once children's age 4 mental health symptomatology was taken into account. The only age 4 mental health variable predicting age 6 suicidal ideation was suicidal ideation, as age 4 internalizing symptoms were only marginally significant ($p = 0.076$) two years later.

Longitudinal prediction for self-harm/suicide attempts at age 6 (Table 2.5) showed a pattern of results that was similar to what was found in the age 6 cross-sectional model. Specifically, failure to provide in early childhood (birth to age 4) associated with over two-fold risk for self-harm two years later. Age 4 self-harm had the largest association with this outcome 2 years later, with attention problems also predicting increased risk. Unexpectedly, internalizing symptoms reversed direction with suicidal ideation once prior self-harm was included in the model, however this could have been due to collinearity.

Discussion

This is the first study to report on different correlates and longitudinal risk factors for suicidal ideation and self-harm in young children at risk for child maltreatment. Prevalence of child suicidal ideation and self-harm in the past 6 months reported by parents were 1.6% and 3.8% at age 4, and 3.2% and 3.1% at age 6, respectively. Other studies of young children have reported 3.8% of suicidal ideation reported by mothers of 1st graders in the past few months (Min et al., 2012), and 11% of lifetime suicidal ideation/self-harm reported by parents of a clinical sample of mostly depressed children aged 3-7 (Whalen et al., 2015). In a prior publication using the LONGSCAN data, age 8 child self-reports of suicidal ideation in the past two months were much

higher, at 9.9% (Thompson et al., 2005). Although rates of ideation are usually higher than rates of self-harm, in the present study, and especially at age 4, self-harm was reported by parents at higher rates than suicidal ideation. Children at these ages may be less able to verbally express their negative feelings and thoughts than through behavior. Indeed, we found that children in the age 6 self-harm group had significantly lower vocabulary levels than their peers with neither suicidal outcome. Among high-risk families, caregivers may also be less responsive to their children's verbalizations (Mesman, van IJzendoorn, & Bakermans-Kranenburg, 2012); while self-harm is a more noticeable behavior. More research on rates of suicidal ideation and self-harm in high-risk and community samples of young children is needed, especially given our longitudinal findings on the persistence of these two behaviors.

Building on what others have reported (Cohen-Sandler, Berman, & King, 1982; Whalen et al., 2015), we found evidence of persistence for suicidal ideation and self-harm between the ages 4 and 6. In fact, suicidal ideation and self-harm were the strongest predictors of future suicidal ideation and self-harm, respectively, even after adjusting for comorbid mental health symptoms. We did not, however, find evidence for a transition between the two time points. That is, 4-year-old children who had talked about killing themselves were not at an increased risk for self-harm two years later. Despite the lack of evidence for transitioning from ideation to self-harm in this sample, it is worth remembering that children under the age of 6 do formulate and carry out lethal suicide plans (Curtin et al., 2016; Pfeffer & Trad, 1988; Tishler, 1980) as well as make multiple suicide attempts and engage in repeated serious self-harm (Paulson et al., 1978; Pfeffer & Trad, 1988; Rosenthal et al., 1986). Therefore, children's suicidal verbalizations and self-harm behaviors should be taken seriously, especially given the recently documented increases in suicide deaths among elementary school children (ages 5-11) in the U.S. (Curtin et al., 2016).

The present study adds new knowledge on the correlates and risk factors for suicidal ideation and self-harm in at-risk young children. Our results suggest that different types of maltreatment in early childhood associate with suicidal ideation and self-harm at age 6 in a different way. While none of the child maltreatment variables were cross-sectionally related to age 4 suicidal ideation, children who had experienced more types of maltreatment by their 6th birthdays were at elevated risk for suicidal ideation at this age. A similar finding was reported by Cicchetti and colleagues (2010) in their community children at-risk for maltreatment, where children with three to four types of maltreatment were more likely than non-maltreated or children with one or two types of maltreatment to have self-reported suicidal ideation. We also found that parents of children who had talked about killing themselves reported significantly more depressive symptoms at each corresponding data wave, and that longitudinal risk for age 6 suicidal ideation from caregiver depressive symptoms remained elevated even when accounting for prior maltreatment measures. However, this association disappeared once children's age 4 mental health was taken into account.

While none of the specific types of maltreatment allegations were associated with age 6 suicidal ideation in multivariate models, CPS emotional maltreatment had the strongest association with this outcome in bivariate models. It may be that parental verbal aggression increases the likelihood that children will also express their distress verbally, in the form of suicidal thoughts, but not by self-inflicting physical harm. Frequent parental denigration may have been internalized by their children into an inner sense of badness that heightened the child's vulnerability to threats of suicide (Pfeffer, 1981).

We found strong evidence that physical neglect, specially failure to provide, is a risk factor specific to young children's self-harm/suicide attempts. This was the only type of maltreatment

which remained associated with age 4 and age 6 self-harm/suicide attempts in cross-sectional models. Longitudinally, early childhood (birth to age 4) failure to provide also predicted age 6 self-harm/suicide attempts. This form of physical neglect was assigned to caregivers whose official maltreatment records showed that they had severely failed to provide consistent and empathic responses to their child's basic physical needs, such as supplying adequate food, clothing, shelter, or health care. Other studies have found that physical abuse and sexual abuse increase the risk of suicidal behavior; however, these studies were conducted in older samples (Beautrais, Joyce, & Mulder, 1996; Miller et al., 2013). It may be that the impact or consequences of these types of maltreatment appear later when the child ages; while in younger children other types of maltreatment such as consistent verbal aggression and failure to provide, are those that place these children at higher risk for suicidal behavior among high-risk families. Children whose parents consistently did not respond to their physical needs could have learned to ignore their body signals as a way to cope, which may facilitate self-harm (Orbach, 2003; Rosenthal et al., 1986).

Our hypothesis that internalizing and externalizing symptoms would be associated with suicidal ideation (Kovess-Masfety et al., 2015) was partially supported by our findings. We found that only parent but not child- reported internalizing symptoms had a significant association with suicidal ideation at ages 4 and 6. This association remained significant in the multivariate models while the associations of suicidal ideation with the other mental health symptom domains did not. Internalizing problems in early childhood (age 4) were a marginally significant predictor ($p = 0.082$) of suicidal ideation two years later. However, attention problems, including problems with concentration, impulsiveness, failure to finish tasks, and problems sitting still, were an independent contributor to self-harm at ages 4 and 6 as well as

longitudinally from age 4 to 6. These findings are similar to what has been found in adolescent and adults, that mood disorders are associated with suicidal ideation and other disorders involving impulse-control are more relevant for suicide attempts than suicidal ideation (Nock et al., 2008, 2013).

Our mental health findings also align with other studies in children that do not distinguish between the two suicidal outcomes (Ben-Yehuda et al., 2012; Rosenthal & Rosenthal, 1984; Whalen et al., 2015). These studies found that not only ADHD, but also conduct disorders were the most prevalent disorders among children with suicidal ideation or self-harm/suicide attempts. Rosenthal and Rosenthal (1984) reported that the 16 suicidal preschoolers in their sample were more hyperactive and impulsive than their demographically-matched behavioral disordered peers. A recent comparison of child (ages 5-11) and early adolescent (12-14) U.S. suicide decedents further suggests that attentional dysregulation is a relevant risk factor for child suicides. Compared to adolescents, a greater proportion of the child suicide decedents (59.3% vs. 29.0%) met criteria for ADHD (with or without hyperactivity) (Sheftall et al., 2016).

This study has several limitations. First, only parent-reported measures of children's suicidal ideation and self-harm were available, and since parents often underreport their children's suicidal behaviors, the number of children with these behaviors may be underrepresented (Gabrielli et al., 2015). Alternatively, children who had spoken to their parents about their suicidal wishes and self-harm may have had at least some hope of caregiver response. Second, although we used single measures to assess each of our two suicide outcomes, this is an improvement over other studies which have collapsed these two items (Becker et al., 2016; Whalen et al., 2015). Indeed, the usage of single items from depression or life event scales is common in studies of suicidal thoughts and behaviors (Gould et al., 1998; Kovess-Masfety et al.,

2015; Mayes, Calhoun, Baweja, & Mahr, 2015) and also in large population-based studies of adolescents (Kann et al., 2016; Nock et al., 2013).

Third, although we included parent assessments of their own psychologically aggressive and physically assaultive behaviors, we primarily relied on CPS reports for our maltreatment data. Since most maltreatment does not get reported to CPS (Sedlak et al., 2010), our results may have underestimated relations between these measures and the outcomes. Next, the data used in this study were conceived of to study the effects of child maltreatment and early disadvantage broadly, and not necessarily child suicidal ideation and self-harm specifically. That said, our secondary use of the LONGSCAN data to study suicidality is in line with the policies and recommendations of numerous national and international research bodies such as the National Institute of Health and the American Foundation for Suicide Prevention. Finally, the results of this selected sample of children at risk for maltreatment or identified as maltreated cannot be generalized to other community-based samples. Nevertheless, a study with the same sample when children were aged 8 identified several risk factors for suicidal behavior that were mostly consistent with the extant literature (Thompson et al., 2005).

Conclusions

Together, our findings regarding different risk factors and correlates of suicidal ideation and self-harm suggest that separating suicidal ideation and self-harm/suicide attempt variables is recommended from a measurement perspective. There are no well-established treatments for suicidal thoughts and behaviors in children, making early identification and prevention urgent (Glenn & Nock, 2014). In line with prior recommendations, our findings suggest that clinicians should carefully assess young children that have been maltreated or are at risk for maltreatment

because they may be at heightened risk for suicidal behavior, and vice versa (Pfeffer & Trad, 1988; Tishler et al., 2007). Our results also suggest that, contrary to the common assumption that physical abuse and sexual abuse pose particular risks for suicidal behaviors (O'Connor & Nock, 2014), young children whose basic physical needs have not been met or who have experienced more types of maltreatment may be at increased risk for self-harm and thinking about suicide, respectively. Different mental health symptoms should be also considered when assessing suicide risk among young children. Special attention is required to children with internalizing symptoms or previous suicidal ideation because of their higher risk of thinking about suicide; and to those children with attention problems or previous self-harm, because they may be currently engaging in self-harming behavior.

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CHAPTER THREE

DEVELOPMENTAL MECHANISMS OF SUICIDAL IDEATION AND SELF-HARM IN MIDDLE CHILDHOOD

Developmental Mechanisms of Suicidal Ideation and Self-Harm in Middle Childhood

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Abstract

Although child abuse and neglect are known risk factors for suicidal thoughts and behaviors, longitudinal studies examining possible mechanisms behind these associations and research on pre-pubertal children are lacking. This study examined indirect effects of early childhood (age 3) abuse and neglect on suicidal ideation and self-harm occurring in middle childhood ($M_{\text{age}} = 9.27$ years). Data are from mother reports using the baseline through age 9 waves of Fragile Families & Child Wellbeing Study ($N = 2,958$). Results from multivariate structural equation models (SEM) that controlled for a range of background characteristics including maternal depression and maternal impulsivity as well as shared variance between mental health symptoms indicated indirect effects of early childhood (age 3) neglect on both suicidal ideation and self-harm via age 5 clinically elevated anxious-depressive symptoms as well as comorbid clinical anxious-depressive and aggressive behavior problems. Results also demonstrated that abuse in early childhood impacts non-fatal self-harm through clinically elevated attention dysregulation. These findings contribute to our nascent knowledge of risk factors and developmental pathways for suicidal ideation and self-harm in childhood.

Developmental Mechanisms of Suicidal Ideation and Self-Harm in Middle Childhood

Suicide is the second leading cause of death among youth aged 10–14 years, and suicide rates in this group increased by 200% in girls and 37% in boys from 2007 to 2014 (Curtin, Warner, & Hedegaard, 2016). Suicidal ideation before puberty (hereafter referred to as children) poses future risk for suicidal ideation (Adrian, Miller, McCauley, & Vander Stoep, 2015; Anderson, 2011) and suicide attempts in longitudinal studies (Herba, Ferdinand, van der Ende, & Verhulst, 2007; Lewinsohn, Rohde, & Seeley, 1994; Musci et al., 2016; Pfeffer et al., 1991, 1993). This is important because suicidal ideation and non-fatal self-harm are more common than previously assumed in children. In children under 12 years, the frequency of suicidal ideation in community studies ranges from 10-15% (Adrian et al., 2015; Lin, Lin, Hsieh, & Chang, 2014; Pfeffer, 1990). Child maltreatment associates with increased risk for these outcomes in children (Soole, Kølves, & De Leo, 2015; Tishler, Reiss, & Rhodes, 2007) and adolescents (Miller, Esposito-Smythers, Weismore, & Renshaw, 2013), yet this literature has offered surprisingly little discussion on developmental pathways that are crucial for early and appropriate prevention.

Etiologic theories of suicide suggest several such potential mechanisms linking maltreatment with suicidal outcomes (Bridge, Goldstein, & Brent, 2006; Brodsky, 2016; Hawton, Saunders, & O'Connor, 2012). However, most research on suicidal thoughts and behaviors in youth has focused on adolescents, been cross-sectional, or relied on collapsed measures of suicidal thinking and/or self-harm behaviors. Therefore, research into the early developmental mechanisms behind the emergence of suicidal thinking and self-harm in youth is needed (Glenn & Nock, 2014). The primary aim of this study is to characterize the indirect pathways involved in the relationships between abuse and neglect in early childhood and suicidal ideation and self-harm in middle childhood.

Theoretical framework

Diathesis-stress models posit that childhood stressors such as abuse and neglect interact with genetic factors to contribute to the development of psychological and personality traits that are associated with increased risk for suicidal behavior (Brodsky, 2016). This increased susceptibility is manifested in impulsive aggression and proneness to depression (Brent & Mann, 2006; Dervic, Brent, & Oquendo, 2008; Pfeffer, Hurt, Peskin, & Siefker, 1995). Mood disorder and susceptibility to aggression increase the likelihood of suicidal behavior when the child is confronted with life stressors (Brent & Mann, 2006; Dervic et al., 2008). However, whether symptoms of depression and problems with aggression mediate the associations between maltreatment and future suicidal ideation and self-harm in children remains to be studied. A simplified schematic of this framework can be found in Figure 1.

Child abuse and neglect

Child maltreatment is generally defined as sexual abuse, physical abuse, psychological abuse, psychological neglect, and physical neglect. Each of these types of child maltreatment have been significantly related to suicidal ideation and suicide attempts in adolescents (King & Merchant, 2008; Miller et al., 2013). Few empirical studies have focused specifically on maltreatment and suicidal outcomes in children (Pfeffer & Trad, 1988; Rosenthal & Rosenthal, 1984). In a cross-sectional study of low-income children ($M_{\text{age}} = 9.19$ years), Cicchetti and colleagues (2010) found that children with any documented maltreatment were more likely than non-maltreated children to express any suicidal ideation (27.5% vs. 21.2%, respectively). Another study linked documented maltreatment at ages 4 and 6 with child-reported suicidal ideation at age 8 in a predominantly low-income sample of children at risk for maltreatment or maltreated (Thompson et al., 2005). The severity of physical abuse, multiple types of maltreatment, and chronicity of

maltreatment had a significant association with suicidal ideation. However, the severity of other types of maltreatment, such as sexual abuse or emotional maltreatment, were not associated with suicidal ideation. These findings require further replication but suggest that different forms of maltreatment may uniquely increase suicide risk in children.

Because most of this work has been done in cross-sectional studies and in adolescents (Liu et al., 2017; Miller et al., 2013), research on potential developmental mechanisms that may drive these associations are lacking (Figure 1). This knowledge is crucial for early and appropriate interventions because it provides information about potential targets that can be addressed in treatment to prevent children that have suffered maltreatment from engaging in suicidal behavior. Another reason it is important to identify developmental pathways is that some risk factors may be susceptible to mitigation (Toth, Gravener-Davis, Guild, & Cicchetti, 2013). The present study extends prior literature by investigating the longitudinal pathways linking child abuse and neglect with suicidal ideation and self-harm as separate outcomes in middle childhood. Utilizing prospective data regarding parents' abusive and neglectful behaviors in relation to childhood suicidal outcomes increases the confidence that the associations are indeed causal (Brodsky, 2016).

Child mental health symptoms

Children who are suicidal suffer from mental health difficulties such as depression, aggression, and attention problems. Indeed, depressive symptoms are one factor that increase vulnerability to suicidal ideation and self-harm/suicide attempts in children (Dervic et al., 2008; Pfeffer et al., 1993; Soole et al., 2015). Earlier work in psychiatric outpatient settings (Pfeffer, Plutchik, Mizruchi, & Lipkins, 1986; Pfeffer & Trad, 1988; Rosenthal & Rosenthal, 1984) documented hopelessness, worthlessness, and depression in suicidal children. Clinical and

community-based studies of children find associations of depressive symptoms (Becker et al., 2016; Bourdet-Loubère & Raynaud, 2013; Hetrick, Parker, Robinson, Hall, & Vance, 2011) with collapsed measures of suicidality (suicidal thoughts and/or self-harm/suicide attempts). Other researchers have found links between child reports of their own depressive symptoms with suicidal ideation in cross-sectional (Lin et al., 2014; O’Leary et al., 2006), and longitudinal studies even after controlling for prior ideation (Anderson, 2011; Vander Stoep et al., 2011). Depression is a documented outcome of child maltreatment in children (Banny, Cicchetti, Rogosch, Oshri, & Crick, 2013; Maughan & Cicchetti, 2002) and adolescents and adults (Nanni, Uher, & Danese, 2012). Therefore, depression may be one mechanism linking child maltreatment with suicidal thoughts and behaviors in children. Moreover, it is still not clear whether depressive symptoms association with suicidal ideation or with self-harm in children, or whether these associations hold when adjusting for other covariates.

Interpersonal aggression is another sequela of child abuse and neglect (Shackman & Pollack, 2014) and has been implicated in suicide attempt and suicide ideation in meta-analysis (Norman et al., 2012). Studies of children that included measures of oppositional or aggressive behaviors report positive associations of both sets of symptoms with collapsed measures of suicidality (Becker et al., 2016; Nuttall & Jackson, 2001), suicide ideation (Adrian et al., 2015), and suicide attempt (Bodzy, Barreto, Swenson, Liguori, & Costea, 2016). Rosenthal and Rosenthal (1984) compared suicidal preschoolers who had been referred to an outpatient clinic with behaviorally disordered preschoolers matched by key demographics. Children who were suicidal displayed significantly more depression, impulsivity, and hyperactivity. The only study to separate suicidal thoughts from suicidal behavior (Bodzy et al., 2016) examined children in a range of ages (7-12) who were admitted as psychiatric inpatients. Therefore, research in children from community

samples as well as longitudinal studies are needed.

Difficulty regulating attention is another possible contributing factor for suicidal thoughts and behaviors in children. Among youth with either suicidal ideation or suicide attempts, Attention Deficit Hyperactivity Disorder (ADHD) was more prevalent among children aged 11 or younger; while among adolescents (aged 12-18), mood disorders was more prevalent in one clinical study (Ben-Yehuda et al., 2012). In a sample of children ages 6-9 with aggressive behavior problems, children with suicidal ideation reported more ADHD symptoms, depressive symptoms, oppositional defiant disorder (ODD), and conduct disorder (CD) symptoms compared to their non-suicidal peers (Wyman et al., 2009). A tendency toward interpersonal aggression and difficulty modulating attention are two sequelae of child abuse and neglect (Cicchetti, 2016; Shackman & Pollack, 2014). Thus, aggressive behavior and attention problems could be developmentally relevant mechanisms of the transmission of suicide risk among maltreated children.

A handful of studies has examined comorbidity between externalizing and internalizing symptomatology in children and has found a higher risk for suicide among those who present combined psychopathology. In a sample of community-based sixth graders, children with comorbid CD and depressive symptoms had the highest risk for suicidal ideation, suicide attempts, and repeated suicide attempts at one and two year follow-ups (Vander Stoep et al., 2011). In a large elementary school-based study, comorbid internalizing and externalizing symptoms associated with suicidal ideation (Kovess-Masfety et al., 2015). In another community study, Foley and colleagues (2006) reported that current depressive disorders plus General Anxiety Disorder (GAD), or depressive disorders and a disruptive disorder contributed the greatest risk for suicidality in youth aged 9 to 16 years. Verbal threats of self-harm were more

common in children with comorbid externalizing and internalizing problems, compared to children with neither problem (Angelkovska, Houghton, & Hopkins, 2012). In adults, psychiatric comorbidity plays an important role in suicide attempts (Nock et al., 2009; Nock, Hwang, Sampson, & Kessler, 2010) and particularly for re-attempts (Blasco-Fontecilla, Rodrigo-Yanguas, Giner, Lobato-Rodriguez, & De Leon, 2016). As with the other mental health dimensions posited to pose vulnerability to suicidal behavior, longitudinal studies and particularly research on children is lacking.

The current study

Diathesis-stress models of suicide and research posit that abusive and neglectful caregiving increase vulnerability to suicidal thinking and behavior via difficulties with depression, attention regulation, and aggression (Bridge et al., 2006; Brodsky, 2016; Hawton et al., 2012). However, the majority of this research has been conducted with adolescents and has been limited by cross-sectional or retrospective designs, combined measures of suicidal ideation and self-harm, and a lack of attention to potential developmental mechanisms (Miller et al., 2013). To evaluate these hypothesized relationships, we employed structural equation modeling (SEM) to examine indirect effects of early childhood (age 3) abuse and neglect on children's suicidal ideation and self-harm at age 9. Clinically elevated levels of children's depressive symptoms, attention dysregulation, aggressive behaviors, and comorbid anxious-depressive and aggression at age 5 were examined as intermediaries.

Method

Sample

Data were drawn from the Fragile Families and Child Wellbeing Study (FFCWS), a

longitudinal birth cohort of children born to mostly unmarried parents (Reichman, Teitler, Garfinkel, & McLanahan, 2001). The sample was designed to be representative of non-marital births and included a comparison group of married parents. Participants were recruited from a sample of hospital births in 20 U.S. cities with populations larger than 200,000. Baseline interviews took place just after the focal child's birth between 1998 and 2000 ($N = 4,898$) while the mothers were still in the hospital. Two thirds of the mothers in the baseline sample were unmarried ($n = 3,712$) and the rest were married ($n = 1,186$) at the time of the focal child's birth. Primary caregivers in the baseline sample were interviewed by telephone or in-home when the child was ages 1, 3, 5, and 9. All parents who had participated in the core surveys were invited to take part in an additional In-Home interview at the latter three respective waves.

Primary caregivers were eligible for inclusion in the present study if they had complete data on both age 9 outcomes and had participated in either the age 3 or 5 In-Home surveys. Of the 3,400 primary caregivers for whom data were obtained on the age 9 Child Behavior Checklist (CBCL/6-18) (Achenbach, 1991a), 3,315 had valid data on both the suicidal ideation and self-harm outcome variables. Of these participants, 2,958 had data on either the age 3 or age 5 In-Home interviews, and 2,121 participated in both of these interviews. The final analytic sample therefore consisted of 2,958 families and descriptive statistics are provided in Table 3.1.

Proportions of missing data in the analytic sample varied from zero on items which were collected at baseline such as child gender and race/ethnicity to 16.3% on children's mental health problems assessed at the age 5 survey. To examine how excluded participants ($n = 357$) may have differed from those in the analytic sample, we compared the two samples on demographics, child maltreatment variables, child mental health variables, and outcome measures. The proportion of Hispanic participants was lower in the analytic sample (37.0% vs. 24.2%; $\chi^2 = 27.57, p < 0.001$).

Analytic sample mothers were more likely to have completed at least some college at the time of the focal child's birth (36.3% vs. 27.5%; $\chi^2 = 10.96, p < 0.004$). Slightly more mothers in the analytic sample met criteria for Major Depressive Disorder by the time their child was 3 years old (28.2% vs. 22.2%; $\chi^2 = 5.13, p < 0.023$). To retain as many observations as possible, we used multiple imputations with chained equations to create 10 datasets to data on the remaining variables. All results and descriptive statistics reflect averaged values over the 10 imputed datasets.

Measures

Dependent variables

Suicidal ideation and self-harm/suicide attempts. Dependent variables were taken from the CBCL/6-18 (Achenbach & Rescorla, 2001), which was administered to primary caregivers at the age 9 In-Home interview. The CBCL/6-18 contains 111 parent-rated items, each scored: 0 (*not true*), 1 (*somewhat or sometimes true*), or 2 (*very true or often true*). The two items were: "Child talks about killing self" and "Child deliberately harms self or attempts suicide". For the purpose of statistical analyses, these two items were dichotomized into present (1) and absent (0). Three mutually exclusive groups were created based on two items from the CBCL/6-18. Children with neither suicidal ideation nor self-harm/suicide attempt served as the comparison group. The suicidal ideation group was comprised of children with suicidal ideation but no self-harm/suicide attempts, and the self-harm/suicide attempt group included children with this outcome whether or not they also had suicidal ideation.

The suicidal ideation and self-harm/suicide attempt items from the CBCL and its child-report version, the Youth Self Report (Achenbach, 1991b) have been used in several other studies

(Herba et al., 2007; Sourander et al., 2001; Sourander et al., 2006) providing evidence for predictive validity and clinical utility. Prior studies provide evidence for the clinical utility and construct validity of these two CBCL items. In a large longitudinal community-based study of 11 year old children, the suicidal ideation item from the CBCL was strongly predictive of suicidal ideation, mood disorder, and anxiety disorder in adulthood (Herba et al., 2007). Another longitudinal study that involved 16- year old adolescents combined parent (CBCL) and youth reports (from youth on the CBCL companion version, the Youth Behavior Checklist) on a collapsed measure of both items (“suicidality”) used in the current study. Adolescents with any suicidality at age 16 had significantly higher concurrent levels of internalizing and externalizing problems. Children’s reports of their own depressive symptoms at age 8 were also predictive of their suicidality measure at age 16 (Sourander, Helstelä, Haavisto, & Bergroth, 2001).

Independent variables

Child maltreatment. Our independent variables consisted of parents reports of their own Psychological Aggression, Physical Aggression, and Neglect towards the focal child at the age 3 In-Home interview with the Parent-Child Conflict Tactics Scale (PC-CTS; Straus, Hamby, Finkelhor, Moore, & Runyan, 1998). This measure was designed to assess a range of actual parenting behaviors rather than the consequences of the behaviors that parents use in response to conflict with their children. Primary caregivers rated the frequency with which they had engaged in each behavior in the past year on a scale from 0 (*never*) to 6 (*more than 20 times*).

Psychological Abuse was assessed with five items: shouted, yelled, screamed; swore or cursed; said you'd send child away or kick out; threatened to spank; and called dumb, lazy, or something similar ($\alpha = 0.51$). The five items for Physical Aggression were: shook, hit on the bottom with object, spanked, slapped, and pinched ($\alpha = 0.61$). The five items of Neglect were: had to leave

child alone, too caught up to tell child you loved him or her, unable to feed, unable to get child medical care when needed, and too drunk or high to care for child ($\alpha = 0.54$).

In this study, annual frequency scores for each of the three types of maltreatment were calculated by recoding individual responses to the midpoint of each answer choice (0, 1, 2, 4, 8, 15, and 25). For example, items which were endorsed “3” (3-5 times) by parents were recoded to 4, which is the midpoint between 3-5. Scores were then summed and divided by the number of items so that the scales represent the average frequency of Psychological Aggression, Physical Aggression, and Neglect. Construct validity for the PC-CTS has been demonstrated in several studies (Straus & Hamby, 1997). Because the psychological abuse and physical assault scales were highly correlated ($r = 0.63$), these two scales were averaged to create an index of harsh and abusive parenting at age 3.

Child Mental Health

Child mental health, primary caregiver reports. Parents reported on their children’s mental health problems at age 5 with the Child Behavior Checklist (CBCL/4-18; Achenbach, 1991). Three age-5 syndromes are evaluated in this study: Aggression (20 items), Anxious-Depressive Symptoms (14 items), and Attention Problems (11 items). Parents rated items on a scale from 0 (*not true*) to 2 (*very/often true*). First, raw scales for each syndrome were summed. Cronbach’s alpha was acceptable for all three scales; Aggression ($\alpha = 0.84$), Anxious-Depressive Symptoms ($\alpha = 0.68$), and Attention Problems ($\alpha = 0.74$). Then, dichotomous variables were created to indicate whether children met clinical cutoff levels for each syndrome scale as specified in the CBCL manual (Achenbach, 1991a). An indicator variable was created to represent comorbidity between clinically elevated depressive symptoms and aggressive behaviors versus children without comorbidity.

Covariates

Covariates included child gender (female/male) and the race/ethnicity of the biological mother and father pair as a proxy for child race/ethnicity (Non-Hispanic White, Non-Hispanic Black, Hispanic/Latino, and Mixed/other). Low birth weight for the focal child was collected at baseline and coded as 0 (not low birth weight) and 1 = (< 2500 g). Because Fragile Families did not administer the CTS until age 3, infant spanking was used as an earlier control for physical aggression. Maternal spanking was measured at age 1 by the question: “In the past month, have you spanked (child) because (he/she) was misbehaving or acting up?” The parent’s responses were coded as no spanking in the past month (0) and spanking at least once in the past month (1).

Other controls include mother’s relationship status (0 = married, 1 = cohabiting, 2 = single, neither cohabiting nor married), mother’s education level (0 = less than high school, 1 = high school or equivalent, and 2 = some college or higher), and age at the time of the child’s birth, and number of people in the home (adults and children) in the home at age 3. Socioeconomic status in the year prior to the age 3 interview was measured by the ratio of total household income to the U.S. Census poverty threshold. Values were then converted to a proportion: poor (ratio < 100%), near poor (between 100% and 200%), and not poor (> 200%).

Starting when the child was age 1, primary caregivers were given the Composite International Diagnostic Interview Short Form (Kessler et al., 1998) to assess depression during the prior year. A variable indicating whether the primary caregiver met criteria for major depression in the year before the age 1 or age 3 interviews was derived. Mothers responded to 2 of the 23 items from Dickman’s (1990) impulsivity scale at the age 3 interview. The items were rated from 1 (*strongly agree*) to 4 (*strongly disagree*). The items were: “I often get into trouble because I don’t think before I act” and “I often say and do things without considering the consequences”. These two

items were summed and higher scores indicate greater levels of impulsivity ($\alpha = 0.75$).

Parenting stress was measured at age 3 using a short version of the Parenting Stress Index (PSI) (Abidin, 1995) ($\alpha = 0.64$). Mothers rated how much they agreed with six statements on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Exemplar items are: “You find yourself giving up more of your life to meet your child(ren)’s needs than you ever expected” and “Since having (child) you feel that you are almost never able to do things that you like to do.” Items were summed and higher scores indicate more parenting stress. Mothers’ victimization of physical or psychological aggression from her spouse or current partner was assessed by 7 items from the mother at the time of the age 3 interview. Three physical aggression items were taken from the Conflict Tactics Scale (Straus, Hamby, Boney-McCoy, & Sugarman, 1996) and four psychological aggression items came from the Spouse Observation Checklist (Lloyd, 1996). Exemplar items for physical aggression were “He slaps or kicks you” and for psychological aggression “He tries to keep you from seeing or talking with your friends or family”. A dichotomous variable was created so that 0 = never any victimization and 1 = at least sometimes or often for at least one item.

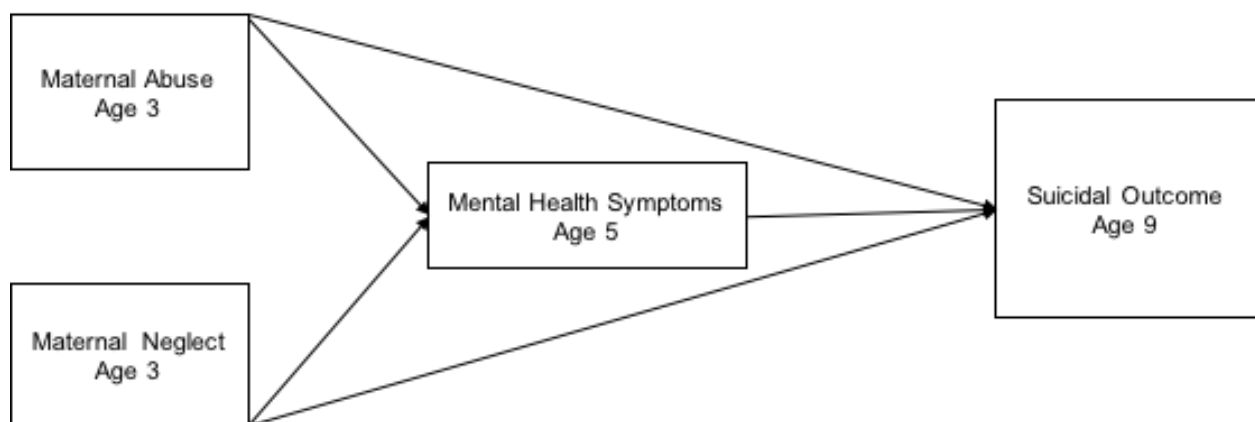


Figure 1. Conceptual model and structural equation modeling approach.

Analysis strategy

First, we computed bivariate binary logistic regressions to investigate initial differences between children without suicidal ideation or self-harm and children with suicidal ideation, and then between the former group and children with self-harm on covariates, independent variables, and mental health variables. Next, structural equation models (SEM) were conducted in Stata (StataCorp., 2015) using the “gsem” command. Indirect effects were computed by using the subcommands “coeflegend” and “nlcom”. Because both the mediator and outcome variables were dichotomous, mediation models used binary logistic regressions. Resulting coefficients for logistic regression models were exponentiated and reported as odds ratios (ORs). Akaike’s information criterion (AIC) and the Bayesian information criterion (BIC) are reported as indices of model fit and are the only fit statistics available for the gsem program in Stata. SEM analyses tested the simultaneous indirect and direct effects of each of child abuse and neglect on suicidal ideation and then on self-harm through one of the four mental health variables at a time, for a total of eight SEM models (Models A-D for suicidal ideation and Model E-H for self-harm). A simplified diagram of our conceptual model can be found in Figure 1.

Results

Suicidal Ideation and Self-Harm Frequency at Age 9

Sixty-five (2.2%) of the nine-year olds in this sample had ever talked about killing themselves (sometimes: $n = 51$, 1.7%; often: $n = 14$, 0.05%). Slightly more children had deliberately harmed themselves or attempted suicide ($n = 72$, 2.5%), and most had done so sometimes ($n = 43$, 1.5%) rather than often ($n = 29$, 1.0%). Although not all children who had self-harmed/attempted suicide also talked about suicide and vice versa, the two behaviors were related ($\chi^2 = 308.54$, $p <$

.001). Specifically, 23 (32.4%) of the children with self-harm/suicide attempt had also said that they wanted to kill themselves. The proportion of children with suicidal ideation who had also self-harmed/suicide attempt was similar ($n = 23$, 35.4%). Children were subsequently categorized into three mutually exclusive groups: a) neither suicidal ideation nor self-harm/suicide attempt ($n = 2,844$), b) suicidal ideation but no self-harm/suicide attempt ($n = 42$), or c) self-harm/suicide attempt ($n = 72$).

Sample Characteristics

Descriptive statistics for covariates across the three suicidal outcome groups are presented in Table 3.1. Binary logistic regressions were used to compare children with neither suicidal ideation nor self-harm to those with suicidal ideation and then to children with self-harm. Boys (Odds Ratio (OR) = 0.49; 95% Confidence Interval (CI) = 0.24-0.95) and non-Hispanic White children (OR = 0.32; 95% CI = 0.15-0.66) were over-represented in the suicidal ideation group compared to girls and non-Hispanic Black children, respectively. Mothers who reported greater levels of impulsivity were more likely to have children with suicidal ideation (OR = 1.24; 95% CI = 1.91-1.52) in middle childhood.

Several maternal characteristics significantly differentiated children with self-harm/suicide attempt from children in the comparison group. Younger maternal age (OR = 0.95; 95% CI = 0.91-0.99), maternal depression in early childhood (birth to age 3) (OR = 2.22; 95% CI = 1.39-3.55), intimate partner violence (OR = 1.93; 95% CI = 1.09-3.43), higher parenting stress (OR = 1.13; 95% CI = 1.04-1.23), and greater levels of maternal impulsivity (OR = 1.25; 95% CI = 1.06-1.46) all demonstrated increased risk for children's self-harm/suicide attempt. In addition, children whose mothers who were neither cohabiting nor married at the time of their birth (OR = 0.39; 95% CI = 0.91-0.99) and whose families were not poor (OR = 0.30; 95% CI = 0.18-0.85)

were over-represented in the self-harm group compared to children whose mothers were married at baseline and whose families were poor, respectively. Subsequent analyses controlled for each of these variables in all models, regardless of whether they associated with children's suicidal ideation or self-harm.

Table 3.1
Sample Characteristics by Age 9 Suicide Outcome Group in the Fragile Families and Child Wellbeing Study ($N = 2,958$)

| | Neither ($n = 2,844$) | Suicidal Ideation ($n = 42$) | | Self-harm ($n = 72$) | |
|-------------------------------------|----------------------------|-----------------------------------|------------------|---------------------------|------------------|
| | M (SE) or % | | <i>p</i> -value | M (SE) or % | <i>p</i> -value |
| Child is female | 47.7 % | 31.0 % | 0.034 | 43.1 % | 0.435 |
| Race/ethnicity | | | | | |
| Non-Hispanic White | 19.3 % | 35.7 % | Ref. | 18.1 % | Ref. |
| Non-Hispanic Black | 56.5 % | 33.3 % | 0.002 | 56.9 % | 0.820 |
| Hispanic/mixed race/other | 24.1 % | 31.0 % | 0.340 | 25.0 % | 0.781 |
| Low birth weight | 9.6% | 26.2% | 0.001 | 9.7% | 0.964 |
| Mother age, birth | 25.04 (0.11) | 26.50 (1.02) | 0.118 | 23.37 (0.66) | 0.021 |
| Mother relationship status, birth | | | | | |
| Neither cohabiting nor married | 40.3 % | 34.8 % | Ref. | 48.6 % | Ref. |
| Cohabiting | 35.1 % | 39.0 % | 0.618 | 40.3 % | 0.778 |
| Married | 24.6 % | 26.2 % | 0.572 | 11.1 % | 0.017 |
| Mother education, birth | | | | | |
| Less than high school | 32.2 % | 40.5 % | Ref. | 41.7 % | Ref. |
| High school or equivalent | 31.3 % | 19.0 % | 0.091 | 34.7 % | 0.568 |
| Some college or higher | 36.5 % | 40.5 % | 0.711 | 23.6 % | 0.023 |
| Number in household, age 3 | 4.37 (0.03) | 4.33 (0.22) | 0.949 | 4.36 (0.22) | 0.962 |
| Poverty ratio, age 3 | | | | | |
| Poor (< 100%) | 42.5 % | 40.0 % | Ref. | 61.5 % | Ref. |
| Near poor (100-200%) | 25.2 % | 26.9 % | 0.815 | 24.4 % | 0.195 |
| Not poor (> 200%) | 32.2 % | 33.3 % | 0.813 | 14.0 % | 0.001 |
| Maternal depression, birth to age 3 | 27.6 % | 35.7 % | 0.246 | 46.6 % | 0.001 |
| Maternal impulsivity, age 3 | 1.61 (0.03) | 2.04 (0.23) | 0.043 | 2.05 (0.18) | 0.007 |
| Maternal parenting stress, age 3 | 8.95 (0.05) | 9.63 (0.40) | 0.096 | 9.84 (0.35) | 0.005 |
| Intimate partner violence, age 3 | 66.3% | 59.5% | 0.360 | 79.2% | 0.024 |
| Maternal spanking, age 1 | 28.2% | 14.3% | 0.053 | 36.1% | 0.142 |
| Child maltreatment, age 3 | | | | | |
| Abuse | 4.11 (0.06) | 4.66 (0.59) | 0.302 | 5.31 (0.48) | 0.004 |
| Neglect | 0.15 (0.01) | 0.36 (0.14) | 0.126 | 0.21 (0.08) | 0.498 |
| Child mental health, age 5 | | | | | |
| Clinical aggression | 38.3 % | 61.9 % | 0.003 | 55.6 % | 0.004 |
| Clinical anxious-depressive | 9.7 % | 33.3 % | <0.001 | 27.8 % | <0.001 |
| Clinical attention | 3.4 % | 11.9 % | 0.006 | 18.1 % | <0.001 |

| | | | | | |
|---------------------------------|-------|--------|--------|--------|--------|
| Comorbid aggression & anx.-dep. | 7.9 % | 26.2 % | <0.001 | 22.2 % | <0.001 |
|---------------------------------|-------|--------|--------|--------|--------|

Note: Descriptive statistics were averaged over 10 multiply imputed data sets. Children with neither suicidal ideation nor self-harm served as the reference group in all comparisons.

As expected, there were considerable differences in mental health problems across the three suicidal outcome groups, such that children with either outcome exhibited greater proportions of each clinical characteristic (Table 3.1). More than half of children in the suicidal ideation (OR = 2.50; 95% CI = 1.30-4.80) and self-harm (OR = 2.01; 95% CI = 1.26-3.22) groups met clinical cut-off levels for age 5 CBCL aggressive behaviors. The odds of suicidal ideation were largest for children who met age 5 clinical levels of anxious-depressive symptoms (OR = 4.78; 95% CI = 2.39-9.41), followed by age 5 clinical attention problems (OR = 4.40; 95% CI = 1.69-11.49), and age 5 comorbid anxious-depressive and aggressive comorbidity (OR = 4.11 (1.98-8.54). Clinically elevated attention problems had the highest odds for self-harm in middle childhood (OR = 6.31; 95% CI = 3.35-11.89) followed by anxious-depressive symptoms (OR = 3.58; 95% CI = 2.11-6.08) and comorbid anxious-depressive/aggressive problems (OR = 3.33; 95% CI = 1.88-5.89). Although children in the suicidal ideation and self-harm groups had each experienced higher mean levels of maternal abuse, this association was only significant for self-harm (OR = 1.09; 95% CI = 1.03-1.16). There were no group differences in child neglect.

Structural Equation Modeling Results

Next, structural equation models (SEM) estimated the indirect effects of early childhood abuse and neglect on age 9 suicidal ideation and self-harm via age 5 mental health symptoms. All SEM models simultaneously evaluated abuse and neglect as well as all three indicators of children's mental health symptoms, except for the comorbidity model. These models also controlled for child gender, child race/ethnicity, low birth weight status, maternal age and marital status at child

birth, age 3 poverty ratio, maternal depression, maternal impulsivity, intimate partner violence.

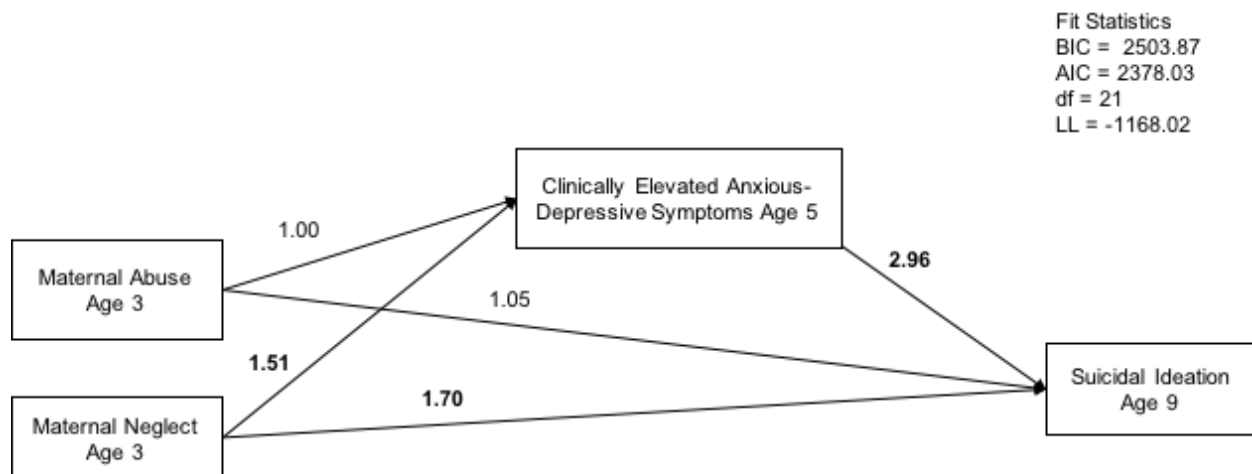


Figure 2. Model B. Path coefficients presented as odds ratios (OR) for structural equation models of the effects of age 3 maternal abuse and neglect on children's age 9 suicidal ideation in the Fragile Families Child and Wellbeing Study ($n = 2,886$). Model controlled for child gender, child race/ethnicity, low birth weight status, maternal age and marital status at child birth, age 3 poverty ratio, maternal depression, maternal impulsivity, and intimate partner violence, as well as clinically elevated attention problems and aggressive behavior problems. Children with neither suicidal ideation nor self-harm served as the reference group. Bold indicates $p < 0.05$.

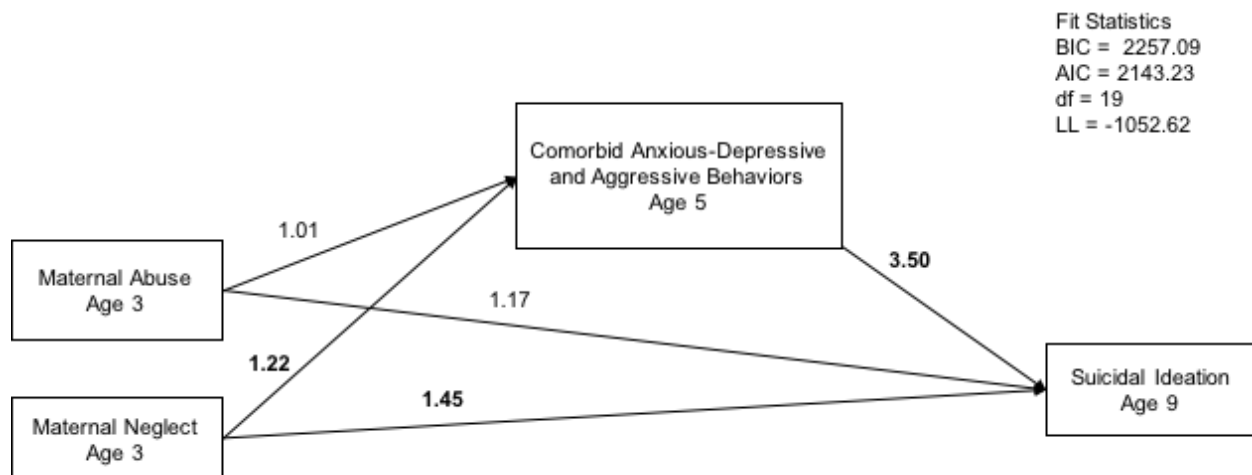


Figure 3. Model D. Path coefficients presented as odds ratios (OR) for structural equation models of the effects of age 3 maternal abuse and neglect on children's age 9 suicidal ideation in the Fragile Families Child and Wellbeing Study ($n = 2,886$). Model controlled for child gender, child race/ethnicity, low birth weight status, maternal age and marital status at child birth, age 3 poverty ratio, maternal depression, maternal impulsivity, and intimate partner violence. Children with neither suicidal ideation nor self-harm served as the reference group. Bold indicates $p < 0.05$.

Four models tested the independent indirect effects of early childhood abuse and neglect on suicidal ideation via children's age 5 aggressive behavior problems (Model A), anxious-depressive symptoms (Model B), clinical attention problems (Model C), and comorbid anxious-depressive and aggressive problems (Model D). No indirect effects of abuse and neglect on suicidal ideation via aggressive behavior problems (Model A) or attention problems (Model C) were found. Early childhood maternal neglect indirectly increased the odds for suicidal ideation at age 9 via clinically elevated anxious-depressive symptoms at age 5 (indirect effect: OR = 1.57; 95% CI = 1.08- 2.25) (Figure 2, Model B). Neglect also indirectly impacted children's suicidal ideation indirectly through age 5 comorbid anxious-depressive symptoms and aggressive behaviors (indirect effect: OR = 1.28; 95% CI = 1.01-1.63) (Figure 3, Model D). Results from each of these four models also indicated that after accounting for child maltreatment and children's mental health status, low birth weight status continued to substantially increase the risk for children's suicidal ideation (ORs = 4.18-4.32). The greater likelihood of non-Hispanic White compared to African American/Black children having suicidal ideation also remained significant (ORs = 0.27-0.28).

In addition to insights about the mechanisms linking child abuse and neglect with suicidal ideation, these models also provide information on which aspects of children's mental health are risk factors for their suicidal ideation. Clinically significant anxious-depressive symptoms (Figure 2, Model B: OR = 2.96; 95% CI= 1.34-6.55), especially when comorbid with aggressive behavior problems (Figure 3, Model D; OR = 3.50; 95% CI = 1.61-7.61) significantly increased the odds of suicidal ideation in middle childhood.

Child Maltreatment and Self-Harm

The same modeling approach was used to test the indirect effects of age 3 abuse and neglect

on self-harm (Models E-H). Figures 4 and 6 (Models F & H) show that early childhood neglect significantly impacted children's risk for self-harm at age 9 via clinically elevated anxious-depressive symptoms (indirect effect: OR = 1.37; 95% CI = 1.04-1.84) and comorbid anxious-depressive symptoms and aggressive behavior problems (OR = 1.29; 95% CI = 1.00-1.42) at age 5. Findings from Model G (Figure 5) indicate that maternal abuse in early childhood had indirect effects on children's self-harm through elevated attention problems at year 5 (indirect effect: OR = 1.09; 95% CI = 1.01-1.19). No other significant indirect effects were found.

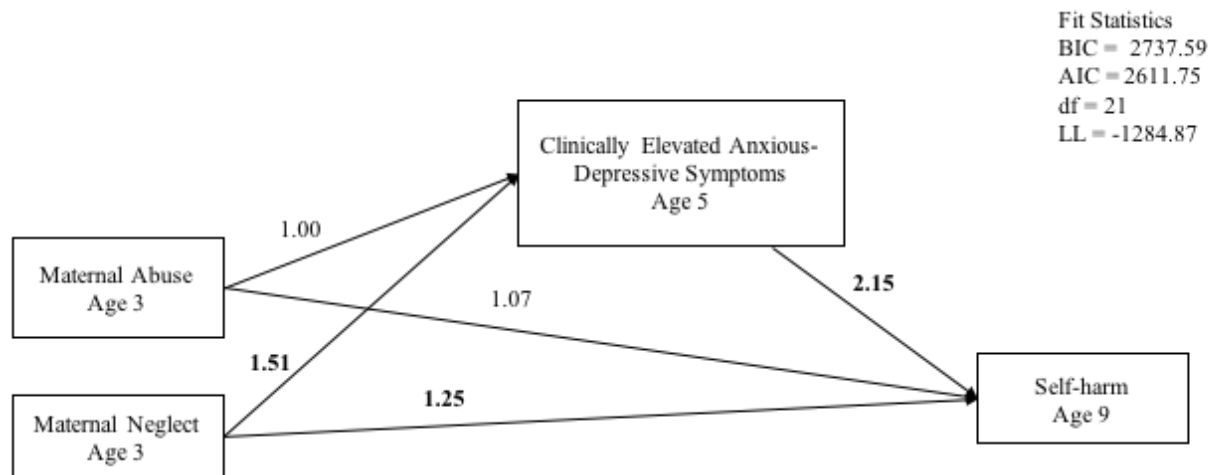


Figure 4. Model F. Path coefficients presented as odds ratios (OR) for structural equation models of the effects of age 3 maternal abuse and neglect on children's age 9 self-harm in the Fragile Families Child and Wellbeing Study ($n = 2,916$). Model controlled for child gender, child race/ethnicity, low birth weight status, maternal age and marital status at child birth, age 3 poverty ratio, maternal depression, maternal impulsivity, and intimate partner violence as well as clinical levels of attention problems and aggressive behaviors. Children with neither suicidal ideation nor self-harm served as the reference group. Bold indicates $p < 0.05$.

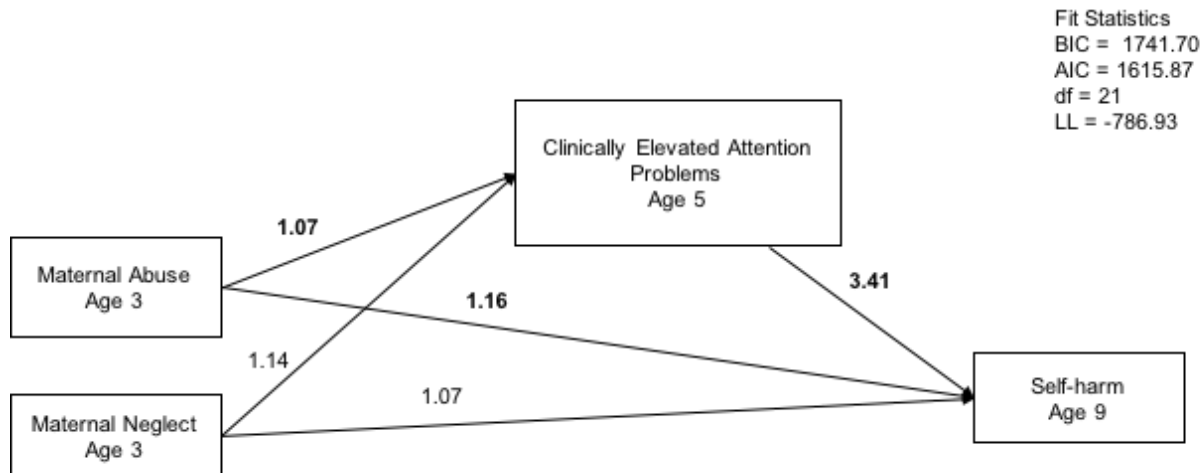


Figure 5. Model G. Path coefficients presented as odds ratios (OR) for structural equation models of the effects of age 3 maternal abuse and neglect on children's age 9 self-harm in the Fragile Families Child and Wellbeing Study ($n = 2,916$). Model controlled for child gender, child race/ethnicity, low birth weight status, maternal age and marital status at child birth, age 3 poverty ratio, maternal depression, maternal impulsivity, and intimate partner violence as well as clinical levels of anxious-depressive symptoms and aggressive behaviors. Children with neither suicidal ideation nor self-harm served as the reference group. Bold indicates $p < 0.05$.

The only covariate to remain significantly related to self-harm risk was age 3 poverty status. Children whose families were not poor when they were aged 3 were less likely to have self-harmed/attempted suicide than children whose family incomes fell below the poverty line (ORs = 0.41-0.44). Overall, our multivariate SEM models point to reliable associations of early childhood abuse and neglect with an increased likelihood of suicidal ideation and self-harm later in childhood. These findings also suggested that the predominant path linking these two types of child maltreatment with later suicidal thoughts and behaviors is comorbid anxious-depressive symptoms and problematic aggression. Young children (age 5) who had clinically elevated levels of anxious-depressive symptoms (OR = 2.15; 95% CI = 1.17-4.14), attention problems (OR = 3.41; 95% CI = 1.74-7.24), and comorbid anxious-depressive symptoms and aggressive behavior problems (OR = 2.42; 1.32-4.44) were at significantly increased risk for self-harm at age 9, even when controlling for a range of covariates and child abuse and neglect.

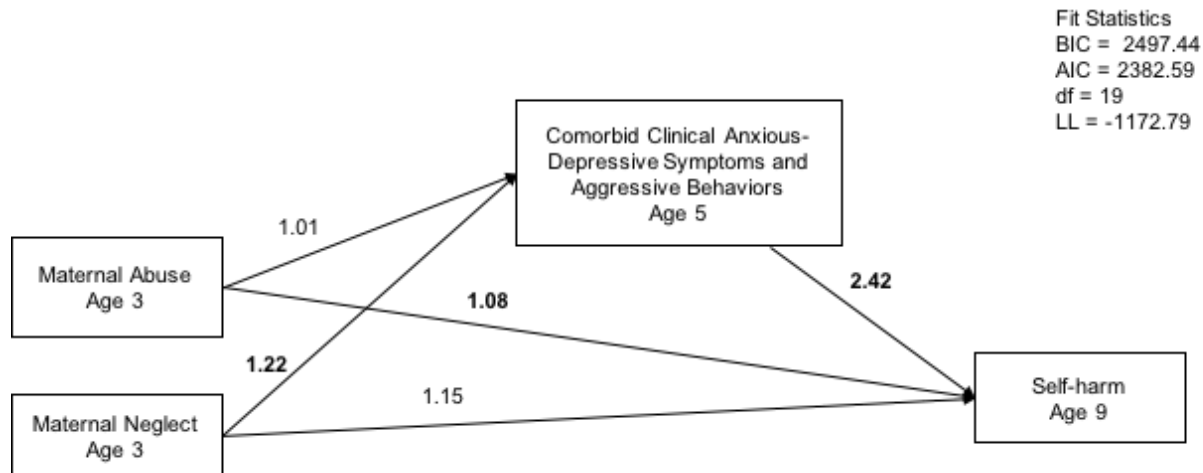


Figure 6. Model H. Path coefficients presented as odds ratios (OR) for structural equation models of the effects of age 3 maternal abuse and neglect on children's age 9 self-harm in the Fragile Families Child and Wellbeing Study ($n = 2,916$). Model controlled for child gender, child race/ethnicity, low birth weight status, maternal age and marital status at child birth, age 3 poverty ratio, maternal depression, maternal impulsivity, and intimate partner violence. Children with neither suicidal ideation nor self-harm served as the reference group. Bold indicates $p < 0.05$.

Sensitivity Tests

To assess the robustness of our results, we conducted two sensitivity tests and compared results across different specifications. Due to collinearity between our measures of psychological abuse and physical abuse, we collapsed these two abuse types in our main analyses. To examine whether our results were due to one or the other form of abuse, we repeated each of our multivariate SEM models twice: the first set examined age 3 psychological abuse and neglect as predictors, the second set used age 3 physical abuse and neglect. Results from these models were comparable and substantive conclusions did not change. That is, neglect, rather than psychological abuse or physical abuse, still indirectly impacted outcomes. Second, to ensure the robustness of our child maltreatment findings, we repeated our SEM models using age 9 child reports of maternal psychological abuse and physical abuse and age 9 child reports of delinquency and internalizing symptoms. Measures of maternal neglect, attention problems, as well as clinical cut-offs (and therefore comorbidity) were not available at age 9 from children.

These cross-sectional results (available upon request) indicated significant indirect pathways from child reports of maternal psychological abuse and physical abuse to suicidal ideation via children's self-reported delinquent behaviors. This indirect pathway was marginally significant ($p = 0.052$) for self-harm.

Discussion

The aim of this study was to examine the indirect pathways linking early childhood abuse and neglect with suicidal ideation and self-harm occurring in middle childhood. Our analyses build upon prior work by utilizing a longitudinal approach and by estimating associations of risk factors for children's suicidal ideation and self-harm separately. These improvements are important because research in adolescents suggests that thinking and talking about suicide and engaging in more harmful suicidal behaviors have different associated risk factors (Glenn & Nock, 2014). In this birth cohort of 9-year-old children, 2.2% had told their primary caregivers that they wanted to kill themselves and 2.5% had harmed themselves or attempted suicide. This is similar to the 2.0% of parents who reported suicidal ideation in their children (Herba et al., 2007) and 4.6% of children ($M_{\text{age}} = 11.7$ years) who reported their own suicidal/self-injurious behavior (Winsper, Lereya, Zanarini, & Wolke, 2012), but lower than the 17% of 9-year-old European school children who reported their own suicidal ideation (Kovess-Masfety et al., 2015). The proportions of suicidal children in the current study are likely lower than these others due to our reliance on parent reports (Kashani, Goddard, & Reid, 1989; Klaus, Mobilio, & King, 2009).

Although child abuse and neglect are widely cited as key risk factors for suicidal thinking and behavior (Miller et al., 2013; Norman et al., 2012; Soole et al., 2015), insufficient attention has been paid to how child abuse and neglect confer suicide risk (Brodsky, 2016). Drawing upon diathesis-stress models (Bridge et al., 2006; Hawton et al., 2012), our analyses improve upon

prior work by accounting for key background characteristics such as maternal depression and impulsivity and controlling for shared variance between mental health variables. Results strongly suggest that neglect in early childhood significantly increases the odds of suicidal ideation and self-harm in middle childhood via clinically elevated anxious-depressive symptoms and comorbid anxious-depressive symptoms and aggressive behavior problems.

Given that neglect is directed at the denial of the child's basic needs for care, these findings are consistent with earlier but lesser discussed developmental theories regarding suicide risk (Adam, 1994; Maltsberger, 1986; Pfeffer, 1986). These models underscore sensitive parenting that supports children's emerging capacities to regulate emotion and develop a healthy sense of self (Adam, 1994; Brodsky, 2016; Maltsberger, 1986; Yates, 2004). Vulnerability to a suicide crisis, which involves a disintegration of the sense of self as well as overwhelming despair, rage, and helplessness, is theorized to originate in early parent-child relationships that fail to meet the young child's needs for modulation of affect (Maltsberger, 1986; Yates, 2004). Indeed, suicidal children explain their desire for death as a way to cope with feeling unwanted, unloved, and to escape unbearable family situations (Pfeffer, 1986; Pfeffer & Trad, 1988; Wyman et al., 2009). It is well established that consistent and sensitive primary caregiver responses to children's distress are necessary for the acquisition of sufficient self-regulation capacities (Hostinar, Sullivan, & Gunnar, 2014).

These lesser-known theories of suicide risk provide additional insights into the our results (Adam, 1994; Pfeffer, 1986). In one such model (Adam, 1994), long-term vulnerability to suicidal behavior occurs via the internal working models of the attachment system. Insensitive and emotionally unavailable caregiving is manifested in reduced self-worth, difficulty regulating affect, and difficulty maintaining supportive relationships, thereby increasing the likelihood of a

crisis when the individual is faced with later disappointment or loss. When faced with repeated episodes of overwhelming distress, the child may grow helpless that others will respond (Adam, 1994; Maltzberger, 1986). Parents of suicidal children and adolescence may also use of threats of abandonment or form symbiotic or overly overprotective relationships with the child wherein the child's needs for autonomy and independence are ignored (Adam, 1994; Orbach, 2007; Pfeffer, 1986).

In addition to our results on child maltreatment, this study also makes important contributions to longitudinal risk factors for children's suicidal ideation and self-harm. We found that children with comorbid clinical levels of anxious-depressive symptoms and aggressive behaviors at age 5 were more likely to present with suicidal ideation (OR = 3.50) or self-harm (OR = 2.42) four years later than children with no comorbidity. These results are analogous to prior work documenting cross-sectional associations of parent-reported comorbid internalizing and externalizing symptomatology with school aged-children's own accounts of their suicidal ideation (Kovess-Masfety et al., 2015). Our findings also corroborate what was found by Angelkovska and colleagues (2012); children with comorbid externalizing and internalizing problems were more likely to have expressed suicidal ideation than children with neither symptom domain. This confirms the results of another community study which found comorbid depression and conduct disorder symptoms in early adolescence to longitudinally predict suicidal ideation, recurrent suicidal ideation, and suicide attempts in adolescence (Vander Stoep et al., 2011). As well, a diagnosis of depression plus anxiety disorder or a disruptive disorder had the strongest association with a combined measure of suicidal ideation and /or suicide attempt in an older community sample (ages 9-16 years) (Foley, Goldston, Costello, & Angold, 2006). In adolescents, child abuse impacts non-suicidal self-injury via multiple psychiatric diagnoses

(Auerbach et al., 2014).

Together, the combined presence of both internalizing and externalizing symptomatology in early childhood should therefore be considered an early marker of risk not only for suicidal ideation as others have demonstrated, but for self-harm as well. This is congruent with findings in adolescents, where approximately half of adolescents who have attempted suicide meet diagnostic criteria for at least two psychiatric disorders (Beautrais, Joyce, & Mulder, 1998; Gould et al., 1998). This is consistent with diathesis-stress models of suicide risk which posit that child maltreatment impacts suicidal behavior via anxiety, impulsive aggression, and depression (Brodsky, 2016; Turecki & Brent, 2016). Comorbidity may be especially pernicious because it is more difficult to successfully treat with medication and psychotherapeutic approaches (Curry et al., 2006). It could be that individuals suffering from multiple difficulties experience greater levels of impairment, leading to an increasingly intolerable situation (Shneidman, 1996). The result is the terrible state of mind from which the majority of adolescents who have attempted suicide report wanting to obtain relief (Boergers, Spirito, & Donaldson, 1998; Jacobson, Batejan, Kleinman, & Gould, 2013; Kienhorst, De Wilde, Diekstra, & Wolters, 1995; Scoliers et al., 2009). Thus, a reduced capacity to manage emotional responses to stress may increase vulnerability to suicide attempts.

Our findings suggest that high levels anxious-depressive symptoms at age 5 confer for self-harm/suicide attempt and suicidal ideation in children. These results extend prior work in children which has shown that depressive symptoms associate with combined variables of suicidal ideation and/or self-harm/suicide attempt (Becker et al., 2016; Bourdet-Loubère & Raynaud, 2013; Hetrick et al., 2011). Distinguishing these two phenomena is critical, as they appear to have divergent diagnostic profiles (Gould et al., 1998) and because most individuals

who think about killing themselves do not attempt suicide (Nock et al., 2013). This is consistent with research showing associations of maltreatment in childhood with children's anxious-depressive symptoms (Maughan & Cicchetti, 2002) and with adolescents' self-harm (Layne et al., 2014).

Our observations regarding suicidal ideation concur with research documenting depressive symptoms as a correlate (Lin et al., 2014; O'Leary et al., 2006; Wyman et al., 2009) and as a longitudinal predictor (Anderson, 2011; Vander Stoep et al., 2011) of ideation. These studies differed in that children reported their own depressive symptoms (Anderson, 2011; Lin et al., 2014; O'Leary et al., 2006; Vander Stoep et al., 2011; Wyman et al., 2009). The current study improves upon prior work by demonstrating that these relationships held even when controlling for shared variance with attention problems and aggressive behaviors, while others have excluded such measures and focused on depression (Anderson, 2011; Lin et al., 2014). Accounting for these additional symptom dimensions is necessary given their covariance (Willner, Gatzke-Kopp, & Bray, 2016) and observations in adolescents that mood disorders associate more strongly with suicidal ideation, while aggression and impulse control associate with more severe forms of suicidality, suicide attempt (Nock et al., 2013).

Together, our findings support the theoretical proposition that children with suicidal thoughts and self-harm may have internalized a sense of badness and hopelessness because of parental indifference and hostility. Some caregivers not only fail to provide the emotional nurturance needed for their children's emerging abilities to tolerate distress, but also serve as a source of distress and alarm for their children (Cicchetti, 2016). Suicidal behavior may be viewed as a desperate distress signal aimed at reestablishing necessary connections, but also as an expression of anger and rage toward neglecting and rejecting caregivers (Adam, 1994). Cohen-Sandler et al.

(1982) found that suicidal children not only had experienced more chaotic events throughout their life span than depressed non-suicidal children and psychiatric controls did, but they experienced an increasing amount of life events that threatened the availability of parental figures. At follow-up, suicidal children were more likely to have succeeded in obtaining more stable, supportive living situations for themselves.

In contrast to prior work in children on suicidal ideation (Adrian et al., 2015; Kovess-Masfety et al., 2015) and suicide attempt (Bodzy et al., 2016), clinical levels of aggression only impacted each outcome when comorbid with clinically elevated anxious-depressive symptoms. We did not find that maltreatment increased the risk of self-harm and suicidal ideation by increasing the tendency for interpersonal aggression. Although problematic aggressive behaviors at age 5 were significantly predictive of children's later suicidal ideation and self-harm in our bivariate analyses, this symptom domain was only associated with increased risk for each outcome when comorbid clinical anxious-depressive symptoms. Research in other child community samples suggests that disruptive disorders may be more strongly related to suicidal ideation (Gould et al., 1998) and collapsed measures of suicidal ideation and/or self-harm/suicide attempt (Whalen, Dixon-Gordon, Belden, Barch, & Luby, 2015) than mood disorders. Our results suggest that comorbid aggressive and anxious-depressive, rather than disruptive disorders per se, may be more relevant for suicidal ideation in children.

Limitations

While this research significantly advances work in the area of childhood suicidal ideation and self-harm, it also has several limitations. First, some of our results may be inflated due to shared method variance because our outcome measures, predictors, and mediators were collected from parents. Fragile Families did not begin collecting data directly from children until age 9,

when our outcome measures were assessed. We chose these data points in order to make use of the longitudinal nature of the study. Second, the data used precluded the inclusion of sexual abuse measures in the focal child, as prior work has documented an increased likelihood of suicidal behavior in children and adolescents who were sexually abused (Miller et al., 2013). Third, although used in other published work (Taylor, Guterman, Lee, & Rathouz, 2009; Whitaker, Phillips, Orzol, & Burdette, 2007), the internal reliability of our three maltreatment variables was not optimal (Cronbach's α range = 0.51-0.61). Fourth, because the Fragile Families study did not begin collecting data on children's suicidal ideation and self-harm until age 9, we may not have actually captured the first emergence of these behaviors. That suicidal thinking is likely to emerge earlier than age 9 is supported by recent community studies that have found no significant differences in the proportions of 6-7 year olds (7.96%) versus 8-9 year olds (9.76%) (Wyman et al., 2009) and 6-8 year olds (17.48%) versus 9-12 year olds (16.54%) with suicidal ideation (Kovess-Masfety et al., 2015). It is therefore important for future studies involving children to administer questions related to suicidal thoughts and behaviors. Finally, caution should be used when generalizing the results from this predominantly disadvantaged sample to children born to non-urban or more advantaged families.

Conclusions and Implications

Our results support diathesis-stress models of suicide risk and suggest that child abuse and neglect that occur early in life may be especially pernicious for suicide risk (Brodsky, 2016; Dunn, McLaughlin, Slopen, Rosand, & Smoller, 2013; Turecki, Ota, Belangero, Jackowski, & Kaufman, 2014). The consistent empirical associations between child maltreatment and suicide ideation and attempts suggest that child maltreatment prevention policies may be useful in preventing youth suicide. Most suicide prevention efforts focus on youth who are already feeling

suicidal, and most are unsuccessful (Glenn, Franklin, & Nock, 2015). Therefore, population-wide interventions as well as those dedicated to youth at greater risk should aim to strengthen children's emerging capacities to self-regulate their emotions and behaviors (Wyman et al., 2009). Because targeting child maltreatment has the potential to reduce not just single, but multiple risk factors for suicide, this approach would have a large impact on reducing suicide (Wyman, 2014) and would also help reduce the burden of psychiatric illness in the general adolescent population (McLaughlin et al., 2012). So-called 'upstream suicide prevention' efforts maximize population impact by reducing risks (e.g. depression, emotion dysregulation) and augmenting protective factors (e.g. supportive relationships) for suicide before suicidality emerges (Wyman, 2014).

This study makes significant contributions to our currently limited understanding of which children are most at risk for suicidal thinking and self-harm. Psychological autopsy studies find previous suicidal communication or behavior in almost half of children who died by suicide (Soole et al., 2015). Although children's conceptual ideas about death may change over time (Speece & Brent, 1984), elementary school children still demonstrate sophisticated understanding of death and suicide (Mishara, 1999). Preschool children have long been observed to be capable of committing serious acts of self-inflicted violence (Kosky, 1983; Pfeffer & Trad, 1988). Rates of suicide in U.S. girls and boys ages 10-14 have increased 200% and 37% in the last 15 years (Curtin et al., 2016), suggesting that child suicidality is still a problem and that children's suicidal communications should be taken seriously.

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CHAPTER FOUR

PROXIMAL LIFE EVENTS AND THE FIRST TRANSITION FROM SUICIDAL
IDEATION TO SUICIDE ATTEMPT IN ADOLESCENTS

Abstract

Background: The aim of this paper is to investigate whether more proximally-occurring stressful life events and conflicts and certain types of such events and conflicts increase the risk for the first transition from suicidal ideation to a recent suicide attempt. A range of vulnerability and protective factors from stress-diathesis models of suicide risk posited to moderate the likelihood that stressful life events precipitate this transition are also examined.

Methods: Data are from a subsample ($N = 928$) of adolescents with lifetime suicidal ideation in the National Comorbidity Survey-Adolescent Supplement (NCS-A). Binary logistic regression analyses compared adolescents with lifetime suicidal ideation but who never had a suicide attempt ($n = 847$) to adolescents with lifetime suicidal ideation who had transitioned to a first suicide attempt within the past year ($n = 81$). Adolescents reported on past year stressful life events, past year serious/ongoing interpersonal problems, past year psychiatric disorders, family functioning, and the quality of social support from parents and peers.

Results: In accordance with diathesis-stress models of suicide risk, multivariate logistic regressions revealed that a past year mood disorder, past year substance use disorder, a past year romantic break-up and greater number of past year stressful life events significantly influenced the transition from suicidal ideation to a first suicide attempt. Among adolescents with suicidal ideation and above average levels of past year stressful life events, better quality peer support buffered the risk for transitioning to suicide attempt, while substance use disorder augmented this risk. Unexpectedly, risk for transitioning from suicide ideation to attempt associated with a romantic break-up was reduced in the presence of a disruptive behavior disorder and at higher levels of mother support, however these specific comparisons were not statistically significant.

Conclusions: These results are only partially congruent with diathesis-stress models of suicide risk; wherein psychological vulnerabilities increase the risk for suicide attempt by amplifying the influence of proximal interpersonal stressors.

Introduction

Several important questions remain regarding the short-term prediction of adolescent suicide attempts. Only one-third of youth with suicidal ideation will progress to a suicide attempt, and this transition is most likely to occur within a year of suicidal ideation onset (Glenn & Nock, 2014; Nock et al., 2013). Adolescents who have attempted suicide say that relational conflicts and losses triggered their behavior (Dieserud, Gerhardsen, Van den Weghe, & Corbett, 2010; Jacobson, Batejan, Kleinman, & Gould, 2013), yet most adolescents who encounter these seemingly commonplace events do not attempt suicide, raising questions about which factors moderate this risk. Diathesis-stress models of suicide suggest several vulnerability and protective factors which may influence these associations (Bridge, Goldstein, & Brent, 2006; Hawton, Saunders, & O'Connor, 2012; Turecki & Brent, 2016), yet research testing these hypotheses in adolescents is still needed. The aim of this study is to investigate proximally occurring stressful life events that increase the risk for transitioning from suicidal ideation to a first suicide attempt, as well as potential moderators of this transition in a community study of adolescents, National Comorbidity Survey-Adolescent Supplement (NCS-A).

Stressful Life Events and Adolescent Suicide Attempts

According to diathesis-stress models of suicide risk, stressful life events such as child abuse and neglect confer long term vulnerability via psychiatric disorders and personality factors, while proximal life stressors act on the underlying diathesis to precipitate suicidal behavior (Bridge et al., 2006; Brodsky, 2016; Hawton et al., 2012; Mann, Waternaux, Haas, & Malone, 1999). Child maltreatment increases the risk for suicidal ideation and suicide attempts via underlying impairments in emotion regulation, proneness to depression, impulsivity, and aggression (Bridge et al., 2006; Brodsky, 2016). Risk for suicide attempt is greatest when proximally-occurring

stressors interact with the diathesis, especially in individuals who have already thought about suicide (Bridge et al., 2006; O'Connor, Rasmussen, & Hawton, 2012; Turecki & Brent, 2016).

Research with adolescents supports the proximal stressor element (Serafini et al., 2015) of these models. In the year leading up to a suicide attempt, suicidal adolescents experience elevated numbers of negative life events, compared to controls (Cohen-Sandler, Berman, & King, 1982; De Wilde, Kienhorst, Diekstra, & Wolters, 1992; Dieserud et al., 2010; Horesh, Nachshoni, Wolmer, & Toren, 2009). These stressors are predominantly interpersonal, and conflict with parents (Hawton & Harriss, 2008; Jacobson et al., 2013) and romantic relationship problems (Kazan, Caele, & Batterham, 2016) are predominant. However, it is not clear whether such stressors associate with suicidal ideation or with suicide attempts. Research that provides a better understanding of the near-term factors which differentiate the approximately one-third of adolescents with suicide ideation who transition to a suicide attempt is therefore needed (Glenn & Nock, 2014). Examining stressful life events in the year prior to the first suicide attempt is also important because it is when most individuals who transition from thinking about to attempting suicide do so (Kessler, Borges, & Walters, 1999; Nock et al., 2013).

In one of only two studies to examine recent (past 12 months) life events in the progression from suicidal ideation to suicide attempt, adolescents in the latter group had significantly more negative life events than the former group (King et al., 2001). However, analyses did not account for covariates and the researchers were unable to further examine differences in these two groups due to low statistical power. In their large multi-country study of European secondary school students, Madge and colleagues (2011) found that adolescents who had engaged in past-year self-harm were distinguished from those who had only thought of self-harm by past year life events of physical abuse or sexual abuse, sexual orientation concerns, and knowing someone who had self-

harmful or committed suicide. As predicted by diathesis-stress models (O'Connor et al., 2012), impulsivity also distinguished these two groups, but interactions with impulsivity and life events in relation to self-harm were not tested.

Two other studies examined whether negative life events distinguish community adolescents with thoughts of self-harm from actual self-harm behavior, but used measures of life events occurring over the lifespan, rather than in close proximity to self-harm behaviors. Nevertheless, their results also suggest that adolescents who engage self-harm (O'Connor et al., 2012) or attempt suicide (Borges et al., 2008) encounter more of such stressors during their lives than those who think about self-harm or suicide but do not act. Other work has found that particular kinds of stressful life events associate more strongly than others to adolescent suicide attempts. Specifically, these stressors involve relational conflicts and losses occurring in the year prior to the attempt (Beautrais, Joyce, & Mulder, 1997; Dieserud et al., 2010; Kienhorst, De Wilde, Diekstra, & Wolters, 1995; Lewinsohn, Rohde, & Seeley, 1994). Adolescents who have self-harmed or attempted suicide say that the most important triggers for their behavior were conflicts in relationships with parents (Hawton, O'Grady, Osborn, & Cole, 1982; Jacobson et al., 2013) and family members (Hawton & Harriss, 2008). In Norwegian adolescents in psychiatric services for self-harm that mostly involved poisoning (96%), approximately equivalent proportions of adolescents said that mental health symptoms (68%), problems with parents (68%), and loneliness (69%) influenced their decision to self-harm (Hjelmeland & Grøholt, 2005). A little more than half (53%) endorsed difficulties with romantic partners, which a finding which was also reflected in a sample of Iranian adolescents who expressed "difficulties in love" as their primary reason for attempting suicide (Keyvanara & Haghshenas, 2011).

Several empirical studies have endeavored to clarify how seemingly common life events can

lead to suicide attempts using statistical interactions, with mixed findings. In their longitudinal sample of inpatient adolescents, Daniel et al. (2016) unexpectedly reported that the association of major loss life events in the prior 3 months with subsequent suicide attempts increased when levels of depressive symptoms were low. This finding could have been due to the lack of variability regarding loss events in their sample, as 89% met this criterion. Alternatively, other factors aside from depression may be more salient interactors with negative life events to increase the likelihood of a transition from suicidal ideation to suicide attempt. Indeed, diathesis stress models (Bridge et al., 2006; Turecki & Brent, 2016) and research (Nock et al., 2013) do suggest that impulsive aggression and high anxiety, rather than depressive symptoms or mood disorders should influence the progression from ideation to attempts.

Two further studies of adults have examined whether these hypothesized psychiatric disorders and symptoms moderate the risk of suicide attempt from proximal negative life events and have yielded similarly unexpected findings. Bagge and colleagues (2013) found that in their clinical sample of adults, alcohol problems, drug problems, or borderline personality disorder (BPD) diagnosis neither increased nor decreased the likelihood of a negative life event triggering a suicide attempt. Another study of adults reported that neither the presence of a current major depressive episode (MDE) nor did not influence the relationship between the number of recent stressful life events and a suicide attempt (Oquendo et al., 2014). Contrary to expectations, a BPD diagnosis lowered the risk for suicide attempt from recent life events. This surprising because these particular psychiatric symptoms are characterized by impulsivity and aggression, elements of suicide risk posited to moderate these associations (Brodsky, 2016).

On the other hand, there is some research corroborating the protective factors such as better quality social support that should buffer the risk for the progression from suicidal ideation to

suicide attempt in adolescents (Bridge et al., 2006). In a longitudinal community study of adolescent girls, high levels of parental support and more peer support reduced the risk for suicidality (a composite measure of suicidal ideation and non-suicidal self-injury) among girls with high levels of interpersonal lifetime stressors (Mackin, Perlman, Davila, Kotov, & Klein, 2017). Social support and positive events also reduced the relationship between negative life events and suicide ideation in a sample of college students (Kleiman, Riskind, & Schaefer, 2014). Conversely, longstanding family disturbances and conflicts may potentiate risk for suicide attempts and self-harm in adolescents with recent stressors. When asked to delineate recent triggers and longer-term factors underlying their suicidal behavior, adolescents listed “dysfunctional family” environments as the most salient long-term factor and interpersonal conflicts as the most common trigger (Dieserud et al., 2010).

Study Aims

Together, the aforementioned studies indicate that adolescents encounter higher numbers of negative life events, their risk for transitioning from thinking about suicide or self-harm to acting increases (King et al., 2001; O’Connor et al., 2012). Other research points specifically to stressful interpersonal life events as short term triggers for suicide attempt in adolescents, especially conflicts with family members (Hawton & Harriss, 2008; Jacobson et al., 2013). However, it is unclear whether these specific interpersonal conflicts and events associate with the transition from thinking about suicide to suicide attempts. Furthermore, the majority of youth who encounter interpersonal loss and relationship conflicts do not harm themselves, raising questions about contextual factors and underlying vulnerabilities which moderate this risk. Although diathesis-stress models of suicide risk specify several underlying vulnerabilities (Bridge et al., 2006; Brodsky, 2016; Mann et al., 1999), current research is mixed.

The current study addresses these limitations in several ways. The first aim of this paper is to examine whether more stressful life events and interpersonal conflicts in the past year will associate with the transition from suicidal ideation to suicide attempt. The second aim is to test whether there are specific past year stressful life events and conflicts that are more strongly related to transitioning from thinking about suicide to suicide attempt than other types of life events. Based on prior work (Serafini et al., 2015), it is expected that events and conflicts that are interpersonal, especially with parents and romantic partners, will increase the likelihood for transitioning to a suicide attempt, while other life events and conflicts with casual relations such as neighbors, will not. Third, it is expected that the odds of the transition from suicidal ideation to suicide attempt for the number of stressful life events, conflict with parents, and romantic relationship break-ups will be greater among adolescents who also meet criteria for a disruptive behavior disorder or an anxiety disorder. Conversely, high levels of family cohesion, high levels of parental support, and better-quality peer support should buffer the relation between stressful life events and the transition to suicide attempt.

Methods

Sample

Data are from the National Comorbidity Survey- Adolescent Supplement (NCS-A). The NCS-A is nationally representative survey of adolescents ages 13-18 in the United States ($N = 10,148$) (Kessler et al., 2009). The NCS-A used a dual-frame sampling procedure composed of: a) a household sub-sample of adolescents ($n = 904$) selected from NCS-R households, and b) a school sub-sample of adolescents ($n = 9,244$) selected from schools in the same nationally representative counties as those in the NCS-R. The overall response rate was 82.9%.

Of the 1,166 (11.5% of the total NCS-A sample) adolescents who had lifetime suicidal ideation, 316 (27.1%) had ever attempted suicide, 124 of these suicide attempts occurred within the past year, and 81 were first attempts within the past year. The analytic sample for this study ($N = 928$) was therefore restricted to the adolescents with lifetime suicidal ideation without ever attempting suicide ($n = 847$) and those with lifetime suicidal ideation who had transitioned to a first attempt within the year before the study ($n = 81$).

Measures

Suicidal behaviors. Suicidal ideation, suicide plan, and suicide attempt were assessed with a modified version of the Suicidal Behavior Module of the World Health Organization Composite International Diagnostic Interview (CIDI; Kessler & Üstün, 2004; Merikangas, Avenevoli, Costello, Koretz, & Kessler, 2009). This module begins with an assessment of lifetime suicide ideation (“You seriously thought about committing suicide”). Those who endorsed this item were asked about suicide plans (“You made a plan for committing suicide”) and suicide attempts (“You attempted suicide”) over the lifetime and in the past 12 months. The following two groups were formed: a) lifetime suicidal ideation (with or without a plan, but never a suicide attempt) ($n = 847$) and b) lifetime suicidal ideation with a first suicide attempt within the last year (with or without a plan) ($n = 81$).

Past year stressful life events. Negative life events occurring in the past year were taken from two different adolescent-reported measures. First, adolescents were asked: “In the past 12 months, did you have any of the following stressful experiences?” and presented with a list of 16 stressful life events (Merikangas et al., 2009). The list included: the break-up of a romantic relationship, the break-up of a close friendship, parents separating or divorcing, death of a close friend or family member, serious illness or injury of a close friend or family member, any other

terrible thing happening to a close friend or family member, life-threatening accident or injury to the adolescent, being mugged or physically assaulted, being robbed or held up, being sexually attacked or raped, getting someone else or getting pregnant, being fired from a job or kicked out of school, a serious financial crisis, problems with the police, making a court appearance, and having a big disappointment where something good you were expecting didn't happen. Of these 16 events, only five had sufficient cell sizes (> 15) to be analyzed individually (Table 1). Additionally, dichotomous variables for all 16 events were summed to create an index of the number of past year stressful life events.

Second, adolescents were asked: "Did you have serious ongoing disagreements or problems getting along with any of the following people in the past 12 months?" (Merikangas et al., 2009). Adolescents endorsed yes or no for the following list: spouse/romantic partner, brother or sister, one of your parents or other close relatives, any of your friends, a supervisor or teacher at work or school, anyone else at work or school, and any of your neighbors. Of these 7 possible interpersonal relations, all but two (neighbors and anyone else at work or school) had cell sizes greater than 15 and were examined individually. In addition, all 7 items were summed to create an index of the number of people with whom the adolescent had serious ongoing disagreements in the past year.

Psychiatric disorders. To obtain past-year psychiatric diagnoses as defined by the Diagnostic and Statistical Manual–Fourth Edition (American Psychiatric Association, 1994), a modified version of the World Health Organization Composite International Diagnostic Interview (CIDI) was administered to adolescents (Kessler & Üstün, 2004; Merikangas et al., 2009). The CIDI is a structured diagnostic interview with demonstrated concurrent validity, high inter-rater reliability, and test–retest reliability (Kaufman et al., 1997).

Preliminary analyses indicated too few participants to analyze specific DSM-IV disorders individually, so diagnostic categories were used instead. Specifically, the diagnostic classes were: a) mood (major depressive disorder, dysthymia, bipolar disorder, and irritable depressive disorder); b) anxiety (panic disorder, agoraphobia without panic disorder, specific phobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder, and separation anxiety disorder); c) disruptive behavior (attention deficit/hyperactivity disorder, conduct disorder, intermittent explosive disorder, and oppositional-defiant disorder); and c) substance use (alcohol abuse, drug abuse, alcohol abuse with dependence, drug abuse with dependence, and nicotine dependence) disorders (Merikangas et al., 2009). Diagnoses were obtained without hierarchy rules.

Family cohesion. The WHO CIDI Family Environment module contains 21 items that assess various aspects of family structure, parental psychopathology, and parenting (Merikangas et al., 2009). For the present study, one construct of family functioning which was previously derived via factor analyses using the entire NCS-A sample was used (Rojas et al., 2017). This scale measured the adolescent's perception of the family's level of cohesion with 7 questions on a 4-point Likert-type scale (0 = *never* to 3 = *all the time*). Exemplar items were: "How often did family members let each other know when they were sad or worried?" and "How often did the whole family do things together?" The average of the 7 items was used and higher scores indicate greater levels of family cohesion ($\alpha = 0.82$).

Parent-child relationships. Also from the WHO Family Environment module (Merikangas et al., 2009) and extracted from prior research (Rojas et al., 2017), the quality of parent-child relationships were assessed with 5 items. The questions were completed twice, once to assess the mother-child relationship and again for the father-child relationship. Participants indicated on a

Likert-type scale ranging from 1 (*not at all*) to 4 (*a lot*) how representative each item is of either their relationship with their mother or father. Exemplar items were: “How much did your father (or mother) figure understand your problems and worries?” and “How much could you open up and talk to your father figure about things that were bothering you?”. Items were averaged separately for each parent and higher values indicate greater levels of parent support (α father = 0.90 father, α mother = 0.87).

Peer support. The quality of peer support was measured via three questions previously derived from a factor analysis using the total NCS-A sample (Rojas et al., 2017). An exemplar item was “How much can you open up to friends and talk about worries?” The scale had low internal consistency in this sample (α = 0.56) and in the total NCS-A sample (α = 0.56) (Rojas et al., 2017).

Covariates. The following covariates were used: gender (male, female), age (years), race/ethnicity (non-Hispanic White; Hispanic; non-Hispanic Black/ other), highest level of parent education (less than high school; high school; some college or higher), poverty index ratio, the number of biological parents with whom the adolescent lives (0, 1, 2), and adolescent reports of whether either parent (biological or a parent figure) had ever attempted suicide. The poverty index ratio was based on family size and derived from the ratio of family income to the family’s poverty threshold (≤ 1.5 = low income; > 1.5 to 3 = low-middle income; >3 to ≤ 6 = high-middle income; and > 6 = high income). Adolescents were asked directly about parental suicide attempts as part of the WHO CIDI Family Environment module (Merikangas et al., 2009). Endorsement of a suicide attempt in at least one parental figure was coded 1.

Statistical Analysis

Binary logistic regressions were used to examine preliminary differences in past year negative life events and the proposed moderators (DSM-IV disorders, personality characteristics, social support, and prior trauma) between adolescents with lifetime suicidal ideation but who had never attempted suicide (reference group) and those with lifetime suicidal ideation but who had made a first suicide attempt in the past year (case group). These models adjusted for covariates and simultaneously evaluated all variables within each class of moderators. For example, adjusted odds ratios (OR) for each DSM-IV disorder class variable are from a model which evaluated all four disorder classes and covariates simultaneously.

Then, to investigate whether associations between stressful life events and the transition to the first suicide attempt varied by DSM-IV disorders, personality characteristics, social support, and prior trauma, interactions between these variables were entered into logistic regression models. Statistically significant interaction terms were probed with pairwise comparisons with the stressful life event variable held constant. For example, a significant interaction between past year romantic break-up and past year mood disorder was followed by calculating the odds ratio for transitioning to a suicide attempt for adolescents with a romantic break-up and a mood disorder versus adolescents with a romantic break-up but no mood disorder. Continuous variables were mean-centered prior to their evaluation in interactions. To probe the significant continuous interactions, models with levels of each variable at 1 standard deviation (SD) above, at the mean, and 1 SD below the mean were compared while holding the stressful life event variable constant. Logistic regression coefficients were reported as odds ratios (OR) along with 95% confidence intervals (95% CI). Statistical tests were evaluated at $p < 0.05$.

Results

Sample characteristics. Of the 81 adolescents who had progressed from lifetime suicidal

ideation to a first suicide attempt within the year prior, slightly more than half (50.6%) reported making more than one suicide attempt and 43.2% said of their most recent suicide attempt: “I made a serious attempt to kill myself and it was only luck that I did not succeed”. Fewer reported “I tried to kill myself but knew that the method may not work” ($n = 28$; 35.6%) and “My attempt was a cry for help. I did not intend to die” ($n = 18$; 22.2%). The distribution of covariates across the two suicide outcome groups are presented in Table 4.1 Four covariates significantly distinguished adolescents with suicide ideation only versus those with a first transition to attempt. As expected, female adolescents were more than twice as likely than males (Odds Ratio (OR) = 2.64; 95% Confidence Interval (CI) = 1.50 - 4.65) to have transitioned from suicidal ideation to suicide attempt within the past year. Adolescents in the attempt group were also significantly younger. Family income and parent education also differentiated these two groups, such that adolescents from high income households and whose parents had attended at least some college were less likely to have transitioned from suicidal ideation to suicide attempt. There were no other covariates which significantly distinguished adolescents in these two groups, including having a biological parent or parent figure who had attempted suicide. Subsequent multivariate models therefore controlled for gender, age, parent education, and poverty index ratio.

Table 4.1

Sample Characteristics for Adolescents with Lifetime Suicidal Ideation Only versus a Past Year First Suicide Attempt in the National Comorbidity Survey- Adolescent Supplement ($N = 928$)

| | Suicidal ideation only $n = 847$ | First transition to past year suicide attempt among adolescents with lifetime ideation $n = 81$ | |
|--------------------------|--|---|-------------------------|
| | % or M (SD) | % or M (SD) | OR (95% CI) |
| <i>Covariates</i> | | | |
| Female | 60.6 % | 80.2 % | 2.64 (1.50-4.65) |
| Age | 15.52 (1.48) | 15.16 (1.37) | 0.85 (0.72-0.99) |
| Race/ethnicity | | | |
| non-Hispanic White | 60.1 % | 53.1 % | 1.00 |
| Hispanic | 17.5 % | 22.2 % | 1.43 (0.80-2.55) |
| non-Hispanic Black/other | 22.3 % | 24.7 % | 1.25 (0.72-2.18) |

| | | | |
|-------------------------|--------|--------|-------------------------|
| Parent education | | | |
| < high school | 15.5 % | 25.9 % | 1.00 |
| high school | 27.5 % | 32.1 % | 0.70 (0.38-1.29) |
| >= some college | 57.0 % | 42.0 % | 0.44 (0.25-0.78) |
| Poverty index ratio | | | |
| <= 1.5 low income | 15.0 % | 23.5 % | 1.00 |
| 1.5-3 low-middle income | 17.7 % | 19.8 % | 0.71 (0.35-1.44) |
| 3-6 middle high | 30.9 % | 29.6 % | 0.61 (0.32-1.16) |
| > 6 high | 36.4 % | 27.2 % | 0.48 (0.25-0.91) |
| Living with bio parents | | | |
| Two | 44.4 % | 37.0 % | 1.00 |
| One | 41.8 % | 43.2 % | 1.24 (0.75-2.06) |
| None | 13.8 % | 19.8 % | 1.71 (0.90-3.25) |
| Parent suicide attempt | 5.2 % | 6.4 % | 1.26 (0.48-3.27) |

Bold indicates $p < 0.05$. OR = odds ratio from binary logistic regressions which evaluated one covariate at a time; CI = confidence interval.

Suicide plan and DSM-IV disorder classes. Table 4.2 presents comparisons between the 81 adolescents with a past year new onset suicide attempt to the 847 adolescents with lifetime suicidal ideation only on lifetime suicide plan and past year DSM-IV psychiatric disorder classes. As expected, adolescents in the suicide attempt group had significantly greater proportions of all four past-year DSM-IV disorder classes and were three times as likely to have made a suicide plan. The most striking difference between these two groups was in the prevalence of mood disorders. Over two-thirds of adolescents who had first attempted suicide within the past year met criteria for a mood disorder (71.6%). In contrast, less than half as many adolescents with suicidal ideation but not an attempt met criteria for a mood (30.0%) disorder. After accounting for shared variance between past year DSM-IV disorder classes and covariates, mood disorder continued to distinguish the two groups of adolescents by a more than a 5-fold risk for transitioning from thinking about suicide to attempting (Adjusted Odds Ratio (AOR) = 5.17; 95% CI = 3.02-8.82). Past year substance use disorder (AOR = 2.34; 95% CI = 1.30-4.21) also contributed to this progression. There were differences in the proportion of anxiety and disruptive behavior disorders at the bivariate, but not multivariate model.

Social support. In bivariate comparisons on social support variables between the two groups of adolescents, only more maternal support associated with reduced odds of having transitioned from suicidal ideation to suicide attempt, but this association disappeared after accounting for covariates and other social support variables (Table 4.2). These results suggest few differences between adolescents with suicidal ideation versus suicide attempt in terms of access to social support.

Past year stressful life events and serious/ongoing problems. Differences between adolescents with lifetime suicidal ideation only and those with a first transition to a past year suicide attempt on stressful life events and serious/ongoing interpersonal problems occurring in the past year are presented in Table 4.2. The stressful past year event most common to adolescents with a first suicide attempt was a romantic break-up (58.8%), a big disappointment (50.0%), and serious ongoing problems with parents or close relatives. The results from bivariate logistic regressions illustrate that even when examined one at a time, only stressors and conflicts involving close personal relationships, rather than casual relations (e.g. teachers), are associated with increased risk for transitioning from suicidal ideation to suicide attempt. Specifically, a romantic break-up, the death of a close friend or family member, and serious ongoing problems with family (siblings and parents/close relative) were the only specific stressful events and conflicts distinguishing these two groups of adolescents.

Correspondingly, the results in Table 4.2 also suggest that more individuals with whom the adolescent had serious/ongoing conflicts (OR = 1.24; 95% CI = 1.08-1.42) increases risk for progression to suicide attempt, but also that serious/ongoing problems in specific relationships might be more important for adolescent transitions from thinking about suicide to attempting. Specifically, serious ongoing conflicts with parents or a close relative (OR = 2.04; 95% CI =

1.28-3.25) and with siblings (OR = 1.75; 95% CI = 1.09-2.82), but not with friends, supervisors/teachers, or a romantic partner presented increased risk for transitioning to a suicide attempt from suicide ideation.

After accounting for covariates, a lifetime suicide plan, past year mood disorder and past year substance disorder, only a romantic break-up and more past year life events differentiated adolescents with suicidal ideation versus those with an attempt (Table 4.2). and this event increased the likelihood of transitioning from suicidal ideation to an attempt nearly 2-fold (AOR = 1.88; 95% CI = 1.11-3.18). While the results suggest that risk for transitioning to a suicide attempt increases with the number of past year stressful life events (AOR = 1.52; 95% CI = 1.02-1.35), risk for romantic break-up was higher. These results confirm the importance of interpersonal loss and conflicts as short-term risk factors for adolescent suicide attempts.

Table 4.2

Past Year Stressful Life Events in Adolescents with Lifetime Suicidal Ideation Only versus those with a First Suicide Attempt in the Past Year in the National Comorbidity Survey- Adolescent Supplement ($N = 928$)

| | Suicidal ideation only $n = 847$ % or M (SD) | First transition to past year suicide attempt among adolescents with lifetime ideation $n = 81$ % or M (SD) | OR (95% CI) | AOR (95% CI) |
|---|--|---|--------------------------|--------------------------|
| Lifetime suicide plan | 17.6 % | 60.5 % | 7.17 (4.44-11.58) | 7.37 (4.40-12.10) |
| <i>Past yr. DSM-IV disorder^a</i> | | | | |
| Mood | 30.0 % | 71.6 % | 5.99 (3.61-9.92) | 5.17 (3.02-8.82) |
| Anxiety | 45.3 % | 69.1 % | 2.70 (1.65-4.41) | 1.55 (0.91-2.66) |
| Disruptive behavior | 35.3 % | 46.9 % | 1.62 (1.02-2.56) | 0.96 (0.57-1.61) |
| Substance use | 24.6 % | 37.0 % | 1.81 (1.12-2.91) | 2.34 (1.30-4.21) |
| <i>Social support^b</i> | | | | |
| Family cohesion | 2.63 (0.56) | 2.61 (0.60) | 0.90 (0.60-1.36) | 1.35 (0.71-2.57) |

| | | | | |
|--|-------------|-------------|-------------------------|-------------------------|
| Mother support | 3.15 (0.72) | 2.98 (0.86) | 0.74 (0.55-0.99) | 0.66 (0.42-1.04) |
| Father support | 2.74 (0.84) | 2.75 (0.89) | 1.01 (0.76-1.35) | 1.12 (0.77-1.62) |
| Peer support | 8.83 (2.02) | 8.58 (2.24) | 0.94 (0.84-1.05) | 0.91 (0.81-1.03) |
| <i>Past yr. stressful life events^c</i> | | | | |
| Romantic break-up | 38.2 % | 58.8 % | 2.31 (1.45-3.68) | 1.88 (1.11-3.18) |
| Close friend break-up | 28.4 % | 36.3 % | 1.43 (0.89-2.31) | 1.05 (0.62-1.79) |
| Death of close friend/family | 26.8 % | 40.0 % | 1.83 (1.14-2.93) | 1.49 (0.89-2.52) |
| Serious illness/injury of close | 20.6 % | 22.5 % | 1.12 (0.64-1.94) | 0.86 (0.47-1.60) |
| Big disappointment | 44.4 % | 50.0 % | 1.25 (0.79-1.99) | 0.90 (0.53-1.52) |
| Num. of past yr. stressful events | 2.11 (1.68) | 2.94 (1.83) | 1.28 (1.13-1.44) | 1.52 (1.02-1.35) |
| <i>Past yr. serious/ongoing problems^d</i> | | | | |
| Spouse/romantic partner | 16.3 % | 24.4 % | 1.65 (0.95-2.86) | 1.05 (0.55-1.99) |
| Sibling | 26.5 % | 38.8 % | 1.75 (1.09-2.82) | 1.15 (0.62-2.10) |
| Parents/close relative | 29.6 % | 46.3 % | 2.04 (1.28-3.25) | 1.59 (0.90-2.82) |
| Friends | 25.7 % | 31.3 % | 1.31 (0.80-2.16) | 0.86 (0.47-1.48) |
| Supervisor/teacher | 19.9 % | 25.0 % | 1.34 (0.79-2.29) | 1.06 (0.57-1.97) |
| Num. of past yr. problems | 1.28 (1.83) | 1.84 (1.70) | 1.24 (1.08-1.42) | 1.13 (0.97-1.31) |

Bold indicates $p < 0.05$. OR = unadjusted odds ratio from binary logistic regressions which evaluated one covariate at a time; AOR = adjusted odds ratio; CI = confidence interval. All adjusted models accounted for significant covariates from Table 4.1 and simultaneously evaluated: ^aall past year DSM-IV disorder classes, ^ball social support variables, ^call individual past year stressful life event variables, and ^dall individual serious/ongoing problems variables.

Moderation Analyses of Stressful Life Events and Transition to Suicide Attempt

Past year romantic break-up. Next, analyses explored whether the associations of a past year romantic relationship break-up and risk for transitioning to a suicide attempt varied as a function of having a suicide plan, past year DSM-IV disorder class, and social support. As with the prior

multivariate models, these analyses controlled for significant covariates identified in Table 4.1, past year mood disorder, and past year substance use disorder. Significant interactions were found between past year romantic break-up and a past year DSM-IV disruptive behavior disorder ($b = -1.31$, $SE = 0.51$, $p = 0.01$), family cohesion ($b = 1.06$, $SE = 0.52$, $p = 0.04$), and mother support ($b = 0.78$, $SE = 0.37$, $p = 0.04$) on transitioning from suicidal ideation to a suicide attempt.

Probing the interactions (Table 4.3) indicated that among adolescents with lifetime suicidal ideation who had experienced a romantic break-up in the past year, those who also met criteria for a DSM-IV disruptive behavior disorder were less likely ($AOR = 0.57$; $95\% CI = 0.28-1.16$) to have made the transition to a suicide attempt than those with a romantic break-up and no disruptive behavior disorder. However, this particular combination was not statistically significant. Combinations of high versus average and high versus low levels of family cohesion were also not statistically significant. These null results indicate that the relationship between romantic break-up and transitioning to a suicide attempt vary as a function of family cohesion at locations other than at the mean and SDs. For mother support, although the interaction was significant, adolescents with high levels of mother support (1 SD) above the mean and a romantic break-up were not differently at risk ($AOR = 1.08$; $95\% CI = 0.84-1.38$) than those with a break-up and average levels of mother support. No other interactions were significant.

Table 4.3

Logistic Regression Analyses Examining Past Year Stressful Life Events in Relation to the First Transition from Suicidal Ideation to a Past Year Suicide Attempt as a Function of DSM-IV Psychiatric Disorders and Social Support ($N = 928$)

| | First transition to past year suicide attempt among adolescents with lifetime ideation AOR (95% CI) |
|--|---|
|--|---|

| | |
|--|-------------------------|
| <i>Independent variable: Past yr. romantic break-up</i> | |
| <i>Moderator</i> | |
| Past year DSM-IV impulse control disorder (vs. no) | 0.57 (0.28-1.16) |
| High family cohesion (vs. mean) | 1.20 (0.87-1.68) |
| High family cohesion (vs. low) | 1.60 (0.36-7.01) |
| High mother support (vs. mean) | 1.05 (0.75-1.47) |
| High mother support (vs. low) | 2.02 (0.61-6.74) |
| <i>Independent variable: High past yr. stressful life events</i> | |
| <i>Moderator</i> | |
| Substance use disorder (vs. no) | 1.66 (0.74-3.71) |
| High peer support (vs. mean) | 0.57 (0.39-0.83) |
| High peer support (vs. low) | 0.40 (0.11-1.44) |

Bold indicates $p < 0.05$. AOR = Adjusted odds ratio; CI = Confidence Interval.

Number of past year stressful events. There was a significant interaction between the number of past year stressful life events and a DSM-IV substance use disorder ($b = -0.36$, $SE = 0.15$, $p = 0.02$). However, while holding the level of past year stressful life events at high (1 SD above the mean), adolescents with a past year DSM-IV substance use disorder were not more likely than those without to transition to a first suicide attempt ($OR = 1.66$; 95% $CI = 0.74-3.71$). Quality of peer support also interacted with the number of past year life events ($b = -0.09$, $SE = 0.03$, $p = 0.01$). Among adolescents with high past year life events, youth with who reported high quality peer support were less likely to transition to suicide attempt ($OR = 0.57$; 95% $CI = 0.39-0.83$) than their peers with high life events and mean levels of peer support. Together, these findings provide little support for diathesis stress models of suicide risk and offer few insights into the factors which interact with stressful life events to precipitate the transition from thinking about suicide to attempting.

Sensitivity tests. Three sensitivity tests were conducted to ensure the robustness and generalizability of the findings (full results available upon request). First, the number of past year stressful life events variable included the only significant individual life event (romantic break-up) to distinguish adolescents with suicidal ideation from those with suicide attempt. Therefore,

analyses using the number of past year stressful life events variable which did not include a romantic break-up were repeated and the results did not differ. Thus, the observed relationship between the number of past year stressful life events and the transition from suicidal ideation to a first suicide attempt was not due to the presence of a romantic break-up.

Second, slightly more than half (50.6%) of the adolescents in the suicide attempt group reported making more than one attempt in the past year. To explore how including these adolescents may have impacted results, multivariate models from the main analyses (Tables 4.2 and 4.3) were re-run comparing adolescents with lifetime suicidal ideation but never an attempt to adolescents with past year new onset attempts (2 or more attempts). Substantive findings regarding the linear relationship of past year romantic break-up as well as the statistical interactions with impulse control disorder and the number of stressful past year life events and substance use disorder were the same. However, the only past year DSM-IV disorder class to correlate with transitioning from suicidal ideation to multiple past year attempts was mood disorder. High mother support and peer support each significantly reduced the likelihood of this progression, while the sum of past year stressful life events did not. The biggest difference between the results from this sensitivity test and the main findings was that past year serious/ongoing problems with parents predicted progressing from lifetime suicidal ideation to multiple past year suicide attempts nearly 2.5-fold ($OR = 2.46$). Future research should therefore interrogate the role of family conflicts in precipitating the transition from suicidal ideation to multiple same-year suicide attempts. Also, the findings regarding substance use disorder and romantic break-up presented above (Table 4.2) may only be relevant for adolescents who transition to a single suicide attempt from ideation.

The third sensitivity check involved limiting the case group to adolescents ($n = 35$) with a new

year past year suicide attempt who said that their attempt was “a serious attempt to kill myself and it was only luck that I did not succeed”. The only correlates associated with the progression from lifetime suicidal ideation to a past year serious suicide attempt were a past year DSM-IV mood disorder, more mother support, and better peer support. Results from interactions between a past year romantic break-up and a) an impulse control disorder and b) mother support were the same. However, peer support did not moderate the romantic break-up association. The interactions between the number of past year life events and a substance use disorder ($p = 0.07$) and peer support ($p = 0.09$) were marginally significant but in the same directions as in the main results reported above. Together, the results from the second and third sensitivity checks suggest that the role of substance use disorder in predicting the short term transition from suicidal ideation to suicide attempt is only generalizable to adolescents with single suicide attempts and whose attempts were less “serious”. Nonetheless, there do appear to be meaningful interactions between adolescent romantic break-ups and impulse control disorders, and between the number of past year stressful life events and substance use disorder.

Discussion

The broad aim of this study was to better understand the stressful life events occurring in close proximity to the first transition from thinking about suicide to attempting in a community sample of adolescents. Adolescents who had progressed to a first suicide attempt in the past year were distinguished from their peers with suicidal ideation only by more past year negative life events. This finding is congruent with previous research showing that the number of recent stressful life events is a proximal risk factor for adolescent suicide attempts (Beautrais, 2003; Beautrais et al., 1997; Horesh et al., 2009; King et al., 2001). These results extend the work of King and colleagues (2001) by showing that more recent stressful life events continue to distinguish

adolescents with suicidal ideation versus those with an attempt when accounting for covariates and comorbid psychiatric disorders. Further, the results build upon research from Borges et al. (2008) and O'Connor et al. (2012) by examining stressful life events in a closer time period to the index transition from suicidal ideation to suicide attempt. This is important because research on proximally-occurring factors which associate with progressing to more serious suicidal behavior has the potential to better inform short-term suicide prediction (Christensen, Cuijpers, & Reynolds, 2016; Glenn & Nock, 2014).

While prior research in adolescents (Beautrais et al., 1997; Dieserud et al., 2010; Johnson et al., 2002) and adults (Bagge et al., 2013; Oquendo et al., 2014) underscores interpersonal conflicts and losses as being particularly salient for suicide attempts, results from the present study suggest that proximally-occurring interpersonal stressors also influence the progression from suicidal ideation to suicide attempt. Even when examined one at a time, only serious ongoing problems in familial relationships (siblings and parents/close relative), death of a close friend or family member, and a romantic break-up distinguished adolescents with suicidal ideation from those with suicide attempt. Similarly, only 5 of the 16 possible past year stressful life events had sufficient numbers for initial analyses, and four of these had to do with conflict and loss in interpersonal relationships. It could be that the unbearable affects associated with the suicide crisis are experienced as they were in earlier unresolved trauma (Maltzberger, Goldblatt, Ronningstam, Weinberg, & Schechter, 2011). This is also congruent with a recent systematic review which found that the most widely cited reasons for self-harm other than to die are to deal with distress and exert interpersonal influence (Edmondson, Brennan, & House, 2016). Therefore, it is important to consider the specific nature of proximally-occurring triggers and stressors in understanding suicide risk (Dieserud et al., 2010; Oquendo et al., 2014). To this end,

obtaining the suicidal individual's personal experience with the life events may be key in understanding and treating individuals at high risk for suicide (Jobes, 2012; Kølves, Värnik, Schneider, Fritze, & Allik, 2006; Maltzberger et al., 2011).

While interpersonal conflicts and losses were the only significant variables to distinguish adolescents with suicidal ideation from suicide attempt at the bivariate level, not all of these associations were maintained once other conflicts and life events, covariates, and psychiatric disorders were controlled. A past year romantic break-up was the only individual life event which distinguished the two groups of adolescents in multivariate models. That this result held extends prior work with adolescents who have attempted suicide and endorse romantic relationship problems as significant contributors to their behavior (Hjelmeland & Grøholt, 2005; Keyvanara & Haghshenas, 2011). Romantic relationship break-downs in the prior year have also been identified as precipitating factors for adolescent suicide deaths (Brent et al., 1993; Grøholt, Ekeberg, Wichstrøm, & Haldorsen, 1998). The contribution of romantic and family problems for adolescent suicide attempts and deaths may also vary by age, with parent-child conflict is a more common precipitant for young adolescents who have died by suicide, whereas romantic relationship problems are more common in older adolescents (Brent et al., 1993; Grøholt et al., 1998). A recent systematic review suggested that a younger cohort (under 35 years) may tend to reactive more impulsively to relationship discord and separation and experience a greater sense of hopelessness which may lead to suicidal behavior (Kazan et al., 2016). The prominence of romantic relationship separation as a risk factor for suicide also supports findings from another systematic review which asserts that the acute stage of separation and relationship difficulties in general, are risk factors for suicide (Ide, Wyder, Kolves, & De Leo, 2010).

Although overlapping in demonstrating the importance of interpersonal stressors for

transitioning from suicidal ideation to suicide attempt, there are some differences in the present study from those of two others. In their large European study of secondary school students, Madge et al. (2011) also reported significant bivariate differences between adolescents who had thought about versus engaged in self-harm on similar items of past year interpersonal conflicts and losses (e.g. “problems with or between parents”, “difficulties with friends and peers”, and “death of someone close”), but these associations did not hold in multivariate models and questions on romantic relationship dissolution were not administered. In their cross-sectional study comparing middle and high school students with lifetime suicidal ideation versus a lifetime suicide attempt, Taliaferro and Muehlenkamp (2014) found that dating violence victimization and same-sex sexual encounters distinguished these two groups of boy and girls, respectively.

In the present study, physical and sexual assault, accidents/injuries, and trouble with the law in the past year were too infrequent to be analyzed in relation to suicidal ideation versus attempts. This contradicts results from the Madge et al. (2011) study which examined specific recent life events which distinguish adolescents with self-harm ideation from those who act. Instead, physical or sexual abuse, sexual orientation concerns, and the suicide or self-harm of family or a friend did distinguish the two adolescent groups. These dissimilarities could be due to differences in question wording or the larger sample size in the Madge et al. (2011) study. Alternatively, the data used in the present study, NCS-A, did not inquire about the suicide or self-harm of friends, and it could be that the death of a close friend or family member variable in the current study represented such a death.

To gain more insight into the circumstances under which such seemingly commonplace events would increase the risk for a suicide attempt, the current study examined several interactions with factors posited to increase and decrease this risk. Informed by diathesis-stress models of suicide

risk, it was predicted that psychiatric disorders characterized by aggression, depressed mood, impulsivity (Bridge et al., 2006; Brodsky, 2016; Hawton et al., 2012), and substance abuse (Turecki & Brent, 2016) would differentiate adolescents who attempted suicide in the past year from those who had thought about it but never attempted. In this sub-sample of adolescents with lifetime suicidal ideation, the DSM-IV disorder class most strongly associated with a transition to suicide attempt was the presence of a mood disorder. This is consistent with what was found in a prior study using a different sub-sample of the NCS-A (Nock et al., 2013), and partially congruent with results from a large European adolescent community survey, where depressive symptoms marginally ($p = 0.063$) distinguished self-harm ideators from enactors (O'Connor et al., 2012). Female adolescents were also more likely than males to have transitioned in the past year from thinking about suicide to suicide attempt, which is in line with prior work on adolescent self-harm (Borges et al., 2008; Madge et al., 2011). In the current study, most adolescents in the suicide attempt group were female, which prohibited examining gender interactions.

The association of a romantic break-up with the first transition from suicidal ideation to suicide attempt varied as a function of current DSM-IV disruptive behavior disorder and maternal support. However, in contrast to hypotheses from several leading theories of suicide risk (Hawton et al., 2012; Turecki & Brent, 2016), results from probing specific combinations of these variables yielded insignificant results. No prior work has considered the potential role of psychiatric disorders per se and recent stressful life events in the transition from suicidal ideation to suicide attempt in youth. The only study of adolescents to examine psychiatric symptoms as a moderator of stressful life events on transitioning from ideation to attempt reported reduced risk from elevated depressive symptoms (Daniel et al., 2016). Research in adults has documented

similar findings, the most similar being a diagnosis of borderline personality disorder (BPD) reducing suicide attempt risk from recent stressful life events (Oquendo et al., 2014). Others reported, as in the current study, null interactions between mood disorders and recent stressful life events with suicide attempt (Bagge et al., 2013; Oquendo et al., 2014).

Although not statistically significant, results suggested that adolescents with lifetime suicidal ideation, a past year romantic break-up, and a disruptive behavior disorder were at less risk for transitioning to a suicide attempt than their peers with only the latter two characteristics. This could have been because the disruptive behavior disorder group, which includes attention deficit hyperactivity disorder, is among the most likely among past year DSM-IV disorders to receive psychotropic medications (Merikangas, He, Rapoport, Vitiello, & Olfson, 2013) and access mental health services (Merikangas et al., 2011) which may help attenuate impulsivity and aggression. Similarly, adolescents with high levels of past year stressful life events and a substance use disorder were more likely to have transitioned to suicide attempt than those with this latter characteristic and no substance use disorder. This particular combination was not statistically significant, but in the expected direction. Although data limitations preclude the determination of whether the adolescents in this sample had engaged in acute substance misuse at the time of their attempt, acute substance abuse may facilitate suicidal behavior by lowering inhibitions and restraint for doing so (Turecki & Brent, 2016). Adolescents with substance use disorders and misuse are also less likely to access mental health services (Merikangas et al., 2011) and endorse more negative attitudes about seeking professional help (Gould et al., 2004). Not seeking treatment is associated with wanting to handle problems on one's own (Sylwestrzak, Overholt, Ristau, & Coker, 2015), which is itself associated with more severe suicidal ideation and depression in adolescents (Labouliere, Kleinman, & Gould, 2015).

Finally, the only specific interaction that reached statistical significance was between the number of past year stressful life events and peer support. That better quality peers support would reduce the likelihood of progressing to more serious suicidal behavior was in line with expectations (Bridge et al., 2006; O'Connor et al., 2012). In the present study, adolescents with high levels of past year stressful life events and who also reported high quality peer support were less likely than those with high past year stress and average levels of support to transition to a suicide attempt. The same bivariate finding was reported by Taliaferro and Muehlenkamp (2014) in their school-based study, but their analyses differed in that risk factors associated with the transition from ideation to attempt were not controlled.

Limitations

Although all negative life events and suicidal outcomes in this study occurred in the past year, the precise ordering of these events could not be determined by the data. It is therefore possible that the life events examined in this study did not cause suicide attempts per se, and it is possible that adolescents' suicidal ideation, attempts, or psychiatric problems precipitated the events. Second, data limitations precluded the analysis of factors demonstrated elsewhere to influence the transition from thinking about suicide or self-harm to acting, such as the suicide or self-harm of a friend or family member (Madge et al., 2011). Therefore, associations between stressful life events and suicide attempt may have been overestimated. Third, and related to the first limitation, stressful life events were assessed categorically and the circumstances influencing their importance were derived from statistical models, rather than from the adolescents themselves. As others have argued, the key to developing clinically meaningful interventions lies in identifying the connections between these risk domains from the perspective of the suicidal person (Fowler, 2012; Jobes, 2012; Leenaars, 2004). Future work should incorporate the thoughts, feelings, and

psychosocial context that accompany suicidal thinking and behavior from the perspective of the suicidal adolescent.

Implications

The life events most strongly associated with the transition to suicide attempt from suicidal ideation were seemingly commonplace events such as romantic relationship break-ups and serious ongoing problems with parents or family members. These associations held even when accounting for covariates and psychiatric disorders strongly associated to this transition; mood disorder and substance use disorder. These findings underscore the importance of comprehensive suicide risk evaluations that consider the significance of proximally occurring factors that may influence the first transition from suicidal ideation to suicide attempt in community adolescents. Relational conflicts are consistently the more common precipitant for adolescent suicide attempts. Therefore, treatment of suicidal adolescents might therefore benefit from targeting adolescents' individual needs regarding these conflicts (Dieserud et al., 2010).

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CHAPTER FIVE

THE DEVELOPMENT OF SUICIDAL IDEATION AND SELF-HARM IN

CHILDHOOD AND ADOLESCENCE: CONCLUSION

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The Development of Suicidal Ideation and Self-Harm in Childhood and Adolescence: Conclusion

Suicide is among the top three leading causes of death for youth ages 10-19 (Centers for Disease Control and Prevention (CDC), National Center for Injury Prevention and Control, 2017). The burden of suicide extends to the many more youth who think about, plan for, and attempt suicide every year (L. Kann et al., 2016). General population studies of adolescents indicate that the average ages of onset for suicidal ideation and suicide increase rapidly starting at age 12 (Nock et al., 2013). However, rates of suicidal ideation among children with documented maltreatment histories range from 10-25% and are elevated compared to children without child maltreatment (Cicchetti, Rogosch, Sturge-Apple, & Toth, 2010; Thompson et al., 2005) and comparable or even higher than general population estimates in adolescents (Laura Kann et al., 2014; Nock et al., 2013).

Vulnerability to a suicide crisis, which involves a disintegration of the sense of self as well as overwhelming despair, rage, and helplessness, is theorized to originate in early parent-child relationships that are rejecting and abusive (Adam, 1994; Maltzberger, 1986). Numerous studies report associations of child maltreatment and suicidal ideation or self-harm (suicide attempts and non-suicidal self-injury) in adolescents and children (Miller, Esposito-Smythers, Weismore, & Renshaw, 2013; Serafini et al., 2015), yet longitudinal studies, research on mechanisms, and work in child samples is still needed. Research on which aspects of children's mental health associate with suicide risk is also lacking. Chapters Two and Three address each of these limitations and provide needed evidence for temporal precedence in the relationship between child maltreatment and suicidal ideation and self-harm.

Chapter Two showed that 4 and 6-year-old children with suicidal ideation had significantly higher concurrent levels of internalizing symptoms than their non-suicidal peers, while

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externalizing problems associated with self-harm. Children who had suicidal ideation or self-harm at age 4 were much more likely to have these outcomes two years later. Longitudinal results also suggest a role of the neglect subtype failure to provide for self-harm, a finding which corroborates results from Chapter Three, where maternal neglect in early childhood indirectly impacted age 9 suicidal ideation and self-harm through clinically elevated anxious-depressive symptoms and comorbid clinical anxious-depressive and aggressive behavior problems at age 5. An additional pathway was found between early childhood abuse, clinically significant attention dysregulation, and self-harm.

While child maltreatment confers longer term to suicidal thoughts and behaviors in children and adolescents (Miller et al., 2013; Serafini et al., 2015), relational concerns are the most common proximal factors (Dieserud, Gerhardsen, Van den Weghe, & Corbett, 2010). Chapter Four is the first study to examine past year stressful life events and their relationship with past-year new onset suicide attempts in a community sample of adolescents. Several important findings emerged. Specifically, more past year negative life events distinguished adolescents who had ever thought about suicide from those who had transitioned to a first suicide attempt. Conversely, negative life events in the past year that do not involve disruptions and serious problems in close interpersonal relationships did not associate with this transition. Only two of the five specific past year life events differentiated suicide ideators versus attempters: a romantic break-up and the death of a close friend or family member. Over half (58.8%) of adolescents with a first onset suicide attempt reported a break-up in a romantic relationship during the prior year, and this event increased the likelihood of transitioning from suicidal ideation to an attempt nearly 2-fold. The second goal of this study was to examine whether associations of proximal stressful life events and a first transition from suicidal ideation to suicide attempt varied as a function of

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psychiatric disorders, aggression, and impulsivity, as hypothesized by several leading theories of suicide. Consistent with prior work, the findings in this study only partially supported these predictions.

Like suicide attempts, adolescent suicide deaths are precipitated by the same types of relationship problems (Karch, Logan, McDaniel, Floyd, & Vagi, 2013) and conflicts within the family (Beautrais, 2001; Brent et al., 1993). Given that most adolescent suicide deaths occur at the first suicide attempt (Castellví et al., 2017), a more in depth understanding of the conditions which intensify the probability of family conflicts leading to adolescent suicidal behavior is necessary. Because only a fraction of adolescents seeks help for their suicide attempts (L. Kann et al., 2016) it is necessary to examine the context in which suicidal attempts arise in adolescents in the general population.

Limitations

A fundamental limitation of the studies in this dissertation and the majority of the child maltreatment- suicidality literature generally is the treatment of child abuse and neglect as discrete instances or events. Rather, it is more accurate to conceptualize child maltreatment by caregivers as a marker of a disturbed relational environment (Cicchetti, 2016). Correspondingly, adequate supportive parenting that facilitates normative development is necessary (Cicchetti, 2016), and should not be considered a factor which “protects” against adolescent or child suicidality. In Chapters Two and Three, analyses did not examine dimensions of child maltreatment beyond type such as timing and severity, which are associated with worse outcomes in children (Manly, Kim, Rogosch, & Cicchetti, 2001). In all three studies, measures of suicidal ideation and self-harm/suicide attempts precluded insights into the duration or specific forms these behaviors may have taken. These aspects may be relevant for increasing levels of suicide

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risk (Adrian, Miller, McCauley, & Vander Stoep, 2015; Miranda, Ortin, Scott, & Shaffer, 2014).

Future Research

Several opportunities for improvement in the literature on child and adolescent suicidality remain. Suicidal behaviors are highly complex, multi-determined, and involve subjective meaning to the suicidal person. Because of this complexity, research on suicide has typically proceeded along parallel yet fragmented lines. Further, the majority of suicide interventions target those who have already expressed suicidal behaviors, making earlier prevention programming urgent. Thus, future work should seek to integrate insights from disparate empirical domains to develop primary suicide prevention programs for children.

Child victims of suicide are less likely than adolescent suicide decedents to have suffered from psychiatric illness before their death (Soole, Kölves, & De Leo, 2015). Given that psychiatric symptoms and illnesses are among the most widely studied risk factors for suicidality (Franklin et al., 2017), subsequent studies of children should therefore expand their focus beyond mental health factors to identify other processes that may be relevant for suicidality in this age group.

Suicidal ideation is one of the most reliable predictors of later self-harm and suicide attempts, but most individuals with ideation do not act on their thoughts. Thus, distinguishing individuals in these two groups is an important research priority. However, observational studies show that suicidal thoughts are of an episodic nature. Data using a number of different methods also point to the varied functions of such thinking. Nationally representative U.S. data showed that suicidal ideation at baseline was related to a reduced likelihood of having a suicide plan and attempting suicide ten years later (Borges, Angst, Nock, Ruscio, & Kessler, 2008). This could be consistent with clinical observations that thinking about suicide can have a calming, organizing

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effect in times of distress (Maltzberger, Ronningstam, Weinberg, Schechter, & Goldblatt, 2010).

Future studies should therefore make efforts to account for the varied contexts and meaning in which suicidal thinking occurs. This might also help researchers to identify who is most at risk of acting on their suicidal thoughts.

Clinically meaningful interventions must ultimately include the perspective of the suicidal person (Jobes, 2012; Leenaars, 2004). Methodologically speaking, it is therefore prudent to incorporate both qualitative and quantitative research methods into long term programs of suicide research (Hjelmeland & Knizek, 2010). Relatedly, there are several additional but rarely discussed theoretical models of suicidal behavior which can provide useful insights into the possible developmental mechanisms that may explain the associations between child maltreatment and suicidal thoughts and behaviors (Adam, 1994; Maltzberger, 1986; Pfeffer, 1986). Indeed, there is much earlier evidence on children's and adolescent's suicidal behavior from earlier clinical case studies. These reports (Glaser, 1965; Pfeffer, 1986; Pfeffer & Trad, 1988) provide in depth documentation of the myriad ways in how parents of suicidal children can be hostile and rejecting towards their children. Aspects of these earlier theories are supported by the developmental psychology literature which confirms that the quality of the early parent-child attachment relationship is fundamental for the capacity to tolerate distress, and self-reliance (Carlson & Sroufe, 1995; Hostinar, Sullivan, & Gunnar, 2014; Sroufe, 2005). The attachment system is also relevant for youth suicidality because it is the basis for expectations regarding future care and in social relationships (Adam, 1994; Maltzberger, 1986).

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